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Printed in Italy

Aboard a United Kingdom Herring drifter

SOME ASPECTS OF RECENT TRENDS IN WORLD FISHERIES [1]

I. Total Quantities Produced

More than twenty-three countries have supplied FAO with preliminary data on their 1950 production, which, together with FAO estimates for other regions, are presented in Table 1. The countries included in the Table represented in 1949 about 53 percent of the total world catch.

As a whole, 1950 was a successful year in fish production with a total increase of about 1.2 million metric tons or 9 percent for the countries referred to in Table 1. In North America, catches increased 5 percent over 1949 and were even more in excess of the 1938 level. In Europe, 1950 landings were about 100,000 tons or 2 percent above the previous year, and 11 percent above the 1938 level. Compared with 1949, the total landingsin creased in Germany (Federal Republic), Norway, Spain and Portugal by sizeable quantities and, to a lesser extent, in Finland and Italy, but decreased in Iceland, the United Kingdom, the Netherlands, Ireland, Belgium, Denmark and France.

Although the fisheries of Israel are on a very modest scale, the fact that catches increased from 4,200 tons in 1949, to 7,100 tons in 1950, is worth mentioning as it is the result of calculated efforts. In Latin America where, on the whole, people are becoming more and more cognizant of the importance of developing fisheries industries, 1950 production has been roughly estimated at 2 percent above 1949. The Philippine fisheries appear to have maintained their trend towards recovery. Total production reached 225,000 metric tons in 1950, representing an increase over the previous year.

Great progress was recorded in Japan where, in 1950, catches were 27 percent higher than in 1949.

Fishing from Hong-Kong was good in 1950, and although marketing activities were affected by the political situation, an upward trend continued. It is possible that these results may be indicative of the prevailing conditions off the Chinese coast, at least in the south. A similar steady increase in supplies prevailed in Singapore, despite a decrease in Indonesia.

[1] This article is based on statistics supplied regularly from FAO countries, statistics and other information extracted from official publications, and more sporadic information obtained through the fisheries press and through conversations with experts in the field. Much of the information about Asia and the Far East has been obtained with the help of the regional fisheries officer.

Although no comprehensive statistics are available, there is evidence that no major change in the natural availability of fish occurred

TABLE 1 — TOTAL LANDINGS BY REGIONS AND COUNTRIES, 1938 AND 1946-50

REGION AND COUNTRY	1938	1946	1947	1948	1949	1950
	(..... Metric tons [1] .....)					
EUROPE						
Belgium	42 800	74 000	81 200	70 900	68 300	60 400
Denmark	106 000	201 400	212 400	225 800	255 000	251 200
Finland	22 400	49 100	46 100	46 100	65 700	65 800
France [2]	479 400	289 400	352 200	434 600	435 100	432 000
Germany (Fed. Rep.)	787 300	264 500	302 100	413 400	513 600	560 500
Iceland	274 300	368 200	477 200	464 700	394 200	367 800
Ireland	12 700	22 400	21 500	25 900	18 200	15 100
Italy	195 200	160 200	182 000	170 300	180 000	190 200
Netherlands	235 800	190 400	247 300	269 400	235 800	229 400
Norway	1 139 200	971 900	1 187 800	1 386 500	1 165 700	1 349 300
Portugal	240 600	306 000	280 500	273 800	282 500	301 000
Spain	299 100	594 300	572 400	534 200	551 000	*600 000
Sweden	143 500	183 700	178 800	207 800	202 200	197 600
United Kingdom [3]	1 197 400	1 035 800	1 142 600	1 199 700	1 156 400	988 300
Other Countries [4]	186 900	190 800	226 400	262 300	326 800	341 500
Total	5 362 600	4 902 100	5 510 500	5 985 400	5 850 500	5 950 100
N. AMERICA						
Canada [5]	499 100	623 000	574 100	658 100	604 900	677 700
Newfoundland [6]	*375 000	377 300	278 100	374 900	265 500	249 200
U.S.A. [7]	2 344 800	1 995 800	2 345 100	2 433 000	2 546 500	2 652 100
Other Countries [4]	31 200	73 500	75 500	77 500	*92 500	*92 500
Total	3 250 100	3 069 600	3 272 800	3 543 500	3 509 400	3 671 500
LATIN AMERICA						
Total	*265 000	*300 000	*458 700	*490 900	*504 700	*515 000
ASIA						
Japan [8]	3 521 100	3 265 900	2 967 100	2 453 800	2 980 400	3 793 600
AFRICA						
Union of South Africa	*50 000	*80 000	*100 000	*120 000	*150 000	*250 000
Morocco	33 300	50 900	50 700	69 300	96 300	123 200
Angola	26 200	88 500	72 700	123 300	130 600	*130 000
Grand Total	12 508 300	11 757 000	12 432 500	12 786 200	13 221 900	14 433 400

Source : Official publications and communications

* FAO estimate

[1] Round fresh weight unless otherwise indicated.
[2] The figures for 1938 and 1946-47 contain estimated quantities of crustaceans and mollusks.
[3] Excludes Isle of Man for 1949 and 1950. Figures for Northern Ireland, which are included, are 3,800 tons for 1938 and an estimated 4,000 tons annually for 1946-50.
[4] Includes estimates ; some figures are landed weight.
[5] Excludes Newfoundland and Labrador. Also excludes landings of seaweed (1938 : 644 tons, 1946 : 9,686 tons, 1947 : 10,951 tons, 1948 : 3,545 tons, 1949 : 5,674 tons, and 1950 : 5,299 tons).
[6] Includes Labrador. 1946-48 based entirely on exports plus estimated quantities for domestic consumption ; 1949 and 1950 based directly on estimates of production (landed weight).
[7] Includes Alaska.
[8] Excludes landings in Korea and other islands of the prewar Japanese Empire. 1938 data in this Table are comparable with postwar data, although some of the species may be reported on a landed weight basis.

in Indochina and Thailand during the year, but both countries were affected by conditions interfering with the dried fish trade.

The fisheries of India, Pakistan and Ceylon showed a slight improvement over the previous year. The mackerel and oil-sardine fisheries of Peninsula India have been on a down-swing of one of the many natural fluctuations which characterize those stocks in local fishing operations. The 1949/50 season showed only slight improvement over the previous year.

TABLE 2 — LANDINGS IN EUROPE AND NORTH AMERICA BY SPECIES GROUPS, 1949 AND 1950

SPECIES GROUPS	EUROPE				NORTH AMERICA			
	1949		1950		1949		1950	
	Metric tons	%	Metric tons	%	Metric tons	%	Metric tons	%
All fresh-water teleosteans and salmon, trout, etc...	137 300	2.4	136 700	2.3	409 700	11.7	360 600	9.8
Teleostean flatfishes	211 700	3.6	205 200	3.4	102 900	2.9	121 900	3.3
Cod, hake and similar species	2 278 800	39.0	2 111 000	35.5	608 300	17.3	581 100	15.8
Herring and similar species	1 947 900	33.3	2 091 300	35.2	1 154 700	32.9	1 276 400	34.8
Tunas, true mackerels and similar species.....	165 700	2.8	149 800	2.5	211 800	6.0	228 900	6.2
Other teleostean marine species	718 500	12.2	869 900	14.7	336 700	9.6	331 300	9.1
Ganoids and elasmobranchs	119 500	2.0	110 800	1.8	21 900	0.6	15 200	0.4
Crustaceans and mollusks..	271 100	4.7	275 400	4.6	660 200	18.9	752 800	20.5
Other [1]	—	—	—	—	3 200	0.1	3 300	0.1
Total	5 850 500	100.0	5 950 100	100.0	3 509 400	100.0	3 671 500	100.0

[1] Excludes Canadian landings of seaweed

Australian over-all production fell by 11 percent during the period, despite substantial increases in certain species, notably crayfish.

Landings in the Union of South Africa increased from 150,000 tons in 1949 to 250,000 tons in 1950, mainly due to greater landings of pilchard for which outlets had by then been obtained.

As yet, very limited information is available on landings in 1951; Table 7 contains statistics for a few countries. The marked increase reflected in the over-all figure is mainly attributed to successful winter herring fisheries in Norway.

II. Physical Setting and Means of Production[1]

All over the world there is an awakening of interest in future development. Recovery of the fishing industry has continued and mechanization is progressing in several areas of Asia and the Far East. Reconstruction and reconditioning of the European fleet are more or less completed. During 1950, a number of new units were added and thus, in some countries, prewar efficiency has been surpassed.

The increase during 1950 in the capacity at the disposal of the fisheries industry has been so extensive that an even greater total output than quoted below might have been expected. Undoubtedly in many countries, other factors had an adverse effect on production, such as a prolonged trawler strike in Iceland, voluntarily restricted catching activities by the United Kingdom fleet, unfavorable herring runs off Iceland and declining returns from the North Sea fisheries. Greater emphasis is now being placed on European participation in the North-west Atlantic fisheries.

In the U.S.A. and Canada (except Newfoundland) the rise in catching capacity, coupled with favorable fish runs, have resulted in considerable increases. Japan benefited from greater availability of craft and gear and a wider range of activity. In South and West Africa, several more plants for processing oils and meals from pilchards have been completed and, as a result, much larger quantities landed.

The following is a summary of the most significant developments which reportedly have taken place. In Latin America, mechanization of the fishing fleet is underway as well as the establishment of new facilities for refrigeration, quick freezing and canning. The Chilean fishing fleet is expanding and a few German trawlers, which have come over, contribute to the supplies of raw material.

Substantial mechanization of fishing vessels has also taken place in Asia and the Far East in a few regions but, compared with the total production of the area, the quantitative results are not yet sizable, except in limited centers.

The new craft, which emerged from the postwar reconstruction period in Europe, have a much greater efficiency than the old units. Activities in Arctic waters, off the coast of northern Norway, Svalbard, in the Barents Sea, and off Greenland, were greatly intensified.

III. Prices[2]

The general tendency of rising prices has possibly not been as distinct for fish as for other foods. In many countries, prices rose during the fall of 1950 but, in most cases, this could be ascribed to temporary shortages, except for fish body oils which followed the sharp upward trend of other foods and oils. Whenever fish became more

[1] Unfortunately, as much information of the secondary industries (processing and trade) as was hoped for, is not available for this section.

[2] Some details on price development are also given under *Fisheries Commodities Review*, p. 9.

abundant, prices fell markedly, but in many quarters the industry complains of difficulties in making ends meet as costs of craft, gear and other equipment, as well as the general cost of living, are rising.

Belgium : Owing to the discrepancy between supply and demand, a fall in the price of the main species took place from 1947 to 1949, while the general Belgian food price level was rising steadily. In 1950, the trend of fish prices was reversed due to decreased landings and limitation of imports ; herring which averaged B.Fr. 2.60 per kg. in 1949, was B.Fr. 3.25 during the 1950 season. This situation seems to have restricted the demand.

Canada [1] : The general price at landings in 1950 was lower than in 1949 for the province of Newfoundland but averaged eight percent higher for the rest of the country, including both saltwater and freshwater species. This higher price level, coupled with heavier catches of higher priced species, especially salmon, lobster and halibut, led to an advance in fishermen's incomes.

Denmark [2] : There was a decline in the export price for flatfish, particularly plaice. Domestic prices were rather higher than in 1949, but the cost of oil, cordage and other requirements showed a still greater increase.

France : Prices fell during the first few months of 1950, but extremely high prices were quoted later in the year, apparently because of short supply. Wholesale prices were computed for February 1951 at Fr. 79.18 per kg. for all species, which, although more than the average of the three preceding months, was less than that for February 1950 or 1949. In March, the fall in price was general, the average being Fr. 67.85, principally because landings were 30 percent above the February level. Some old trawlers are laid up as they do not pay their way. Modern units seem to give only moderate profits in spite of the fact that landing prices in France, compared with other countries, are fairly high.

Germany [3] : During the first six months of 1950, average prices were DM. 0.23 per kg. or slightly less than those of 1949. During the last six months, however, prices rose considerably due to a short supply of whitefish and averaged DM. 0.293 per kg.

In 1951, prices fell, particularly for herring. The average per kilogram for herring was DM. 0.3301 in March, compared with DM. 0.41 in 1950, and the average for whitefish was DM. 0.206 compared with DM. 0.217 in March 1950. The price index figure for food costs in West Berlin [4] (basis 1938 = 100) was 173.0 for fish in January and 178.0 in September 1950, compared with 166.3 and 146.0 respectively for all food.

[1] *Trade News*, Vol. 3, No. 9, Department of Fisheries, Ottawa, Canada, 1951, pp. 3.
[2] *Danish Foreign Office Journal*, No. 1, 1951, Ministry of Foreign Affairs, Copenhagen, Denmark.
[3] Prices refer to average prices for fish, landed by trawlers, in the fish markets of Bremerhaven, Cuxhaven, Hamburg-Altona and Kiel.
[4] *Allgemeine Fischwirtschaftszeitung*, Vol. 3, No. 21, Bremerhaven, Germany, second issue in January 1951.

Japan [1] : The price paid to the producer for fish has decreased as a result of the improved over-all food situation during the past year. Lack of experience among new operators in selling on a free market (following a long period of controlled prices and distribution) resulting in inefficient marketing, has temporarily contributed to this decrease in price since the relaxation of government control over marketing in April 1950.

Norway : Prices to fishermen were raised for the 1951 season to N. Kr. 0.47 per kg. (1950 : 0.40) for spawning cod in the Lofoten area, N. Kr. 17 per hectoliter for large herring and N. Kr. 14 per hectoliter for spring herring, that is, an increase of 15-20 percent compared with those of 1950. Average prices [2] in 53 cities and industrial centers were higher in February 1951, than those of February 1950 : round fresh cod caught locally 13.9 percent higher, coalfish 4.0 percent, fresh cod fillets 8.7 percent, dried salted cod 14 percent, etc. with price changes ranging from 16 to 17 percent for all fresh and processed fish except stockfish and derived products which increased 57.3 and 31.5 percent respectively.

Spain [3] : The index numbers for wholesale prices of certain fisheries commodities developed as follows (1914 = 100) :

	Fresh Fish		Dried and Salted Cod	Canned Sardines
	Hake	Sardines		
Calendar year 1949	758.1	751.3	1 162.0	1 035.4
Calendar year 1950	1 021.9	922.5	1 352.1	1 156.8
March 1951	1 434.1	1 068.8	1 791.7	1 151.5

Sweden: Fish prices have remained stable, but fishermen complain of rising costs and of the Government's reluctance to approve higher prices.

United Kingdom : The control of the landing price of fish through a fixed maximum price was lifted in April 1950. Prices then fell sharply, but in October 1950 the situation was reversed owing to limitation of supplies and the reduced capacity of domestic trawlers. Prices have tended to rise during 1951 because of the meat shortage and considerable attention is being given to the desirability of controls. In July 1950, the Government introduced a subsidy policy to last for one year. Furthermore, a semi-governmental body with wide powers, the "Whitefish Authority," has been established to improve the general situation of the industry.

[1] *Commercial Fisheries Review*, Vol. 13, No. 2, United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A. February 1951, p. 59.

[2] *Statistiske Meldinger*, No. 4, Statistisk Sentralbyraa, Oslo, Norway, 1951.

[3] *Boletín de Estadística de España*, Instituto Nacional de Estadística April 1951. Madrid, Spain.

United States of America : Monthly *Index Numbers of Wholesale Prices*[1] for "all fish and shell fish" (1947 = 100), show 113.7 for January 1951, compared with 103.4 for January 1950, and 101.7 as an average for 1949 and 110.0 for 1948. The *Consumer's Price Index for Moderate-Income Families, Large Cities Combined*[2] in the U.S.A. was 347.8 on 15 February 1951, compared with 294.1 on 15 February 1950. Certain fish prices were subject to control during 1950-51.

Retail prices of fresh and frozen fishery products in January/March[2] were the highest on record for that time of year and averaged 6 percent higher than in the same months of 1950. Prices during the next few months are expected to remain higher than for the previous year.

IV. Operational Costs

Rising operational costs are seriously affecting operations in the United Kingdom. The rising prices of fuels, repairs, maintenance, nets, and manila and sisal ropes are especially presenting a grave problem to trawler owners. Increased transportation rates from landing centers, such as Grimsby, England, are adding to fish costs. To transport one 112 lbs. box from Grimsby to Birmingham, England, cost 5/7d. at the beginning of 1950, and, a year later, 7/2d.

The operators in Western Germany are experiencing similar difficulties, especially since the subsidy on fuel oil ceased on 1 April 1951. Most of the deep-sea trawlers are coal-driven, but for the rest, the price of diesel oil will increase from DM. 12 to DM. 24.50 per 100 kg. For the coastal fleet, the increase will be more serious ; their need for oil is greater and the cost per 100 kg. will rise from DM. 13.80 to DM. 45. Such an increase will seriously decrease profits.

The Japanese fisheries,[3] especially the coastal fisheries, are facing serious financial difficulties. A Supreme Commander for the Allied Powers (SCAP) investigation lists the following causes: rehabilitation of craft and gear, depleted financial resources, decline in physical output per fishing unit, decrease in the price of fish with the improvement of the general situation and, finally, the doubling and trebling of costs (prices of fishing requisites) after the removal of government subsidies in April, 1950.

V. Fisheries Commodities Review

A number of countries have submitted estimates of final output of certain fisheries products. In Table 2, this information, together with certain other estimates, is presented in the form of world totals. For certain products, these totals are believed to express world

[1] United States Bureau of Labor Statistics.
[2] United States Department of the Interior, Fish and Wildlife Service. *Quarterly Outlook for Marketing Fishery Products*, April-June, 1951. Fishery Leaflet 336. Washington D.C., U.S.A.
[3] *Commercial Fisheries Review*, Vol. 13, No. 2, February, 1951 p. 59.

production fairly accurately and its changes from year to year since the war; for others, particularly fresh fish, it is incomplete. The recorded increase of approximately one million metric tons in world catches does not necessarily mean a corresponding increase in human consumption. In Europe and Africa, the additional catch was used for oil and meal. In Europe, relatively more cured (salted, smoked, dried, etc.) fish was consumed than in the previous year whereas in North America relatively more fresh frozen or canned fish was used.

(*a*) Fresh Fish

The figure for the total quantity of fresh fish (Table 3) includes most of Europe, North America and Japan. The total sale of fresh fish in 14 countries did not increase materially in 1950 as compared with 1949. However, an increase of over 300,000 tons in Japan compensated for the declines particularly noticeable in Norway, Iceland and the United Kingdom. Fresh fish supplies in Europe were at times unevenly distributed. During the latter part of 1950 the West German markets were under-supplied because Iceland was unable to complete its contract for delivery of fresh fish owing to a trawler strike, while in the United Kingdom, large quantities of cod and other coarse varieties of fish were unsaleable for human consumption and were disposed of to fish meal works.[1]

(*b*) Frozen Fish

There was a slight drop in the world output in 1950, principally due to sharp declines in production in the United Kingdom, Iceland and Norway. The increase in the Canadian output (including Newfoundland) was insufficient to compensate the drop in other countries, which, in many cases, was due to customers' sustained reluctance to buy frozen fish when fresh fish is available. In the United Kingdom, the declining output is due to the withdrawal of the "quick-freeze" subsidy early in 1950. In the U.S.A., the 1950 output was lower than in 1949, but in the first quarter of 1951 the net movement of frozen products into consumption reflects the increased demand. Indications show that the General Ceiling Price Regulations encouraged cold-storage stocks to flow into consumption. Frozen fish production in Canada expanded under the stimulus of exports to the U.S.A.

(*c*) Dried Cod, Hake, etc. (Stockfish)

In three countries the total output increased from 11,000 tons in 1949 to 19,000 tons in 1950. Only in Norway was there a sharp rise; the output in 1950 was still less than in 1938 when 25,000 tons were

[1] Report to the Food and Agriculture Organization by the United Kingdom 1949-50, September 1950, p. 16.

produced. With about 65,000 tons of fresh fish (eviscerated weight) used so far for stockfish production, in Norway in 1951 the annual production is likely to reach the 1938 level.

(*d*) Wet-salted and Dried-salted Cod, Hake, etc.

The world output increased from 259,000 tons in 1949 to 322,000 tons in 1950 and is now well above prewar volume. All countries appear to have expanded their output in 1950 to above their 1949 levels : Iceland's production increased about 180 percent due to a greater proportion of the catch being diverted to salting; Norway had an increase from 24,000 tons in 1949 to 36,000 tons in 1950. The Norwegian expansion was due to similar reasons and increased activities off western Greenland, whence 10,400 tons of wet-salted cod were obtained in 1950 with 37 long-lining craft and 3 trawlers as compared with 34 long-liners in 1949 and only 2 in 1948. Of the coastal cod catch in Norway during the first five months of 1951, 85,000 tons were salted compared with 64,000 tons in 1949 and 87,000 tons in 1938. About 60 vessels participate in the Greenland fisheries during the 1951 season.

It is also likely that the Icelandic production of salted fish (barring strikes similar to that in 1950) will be considerably greater. The Faroe Islands' production was hampered by a strike in the spring of 1951.

In Portugal and Spain, the cod-fishing fleet is being strengthened by new vessels, thus ensuring greater production for domestic needs.

Although the French fleet, operating off Greenland and Newfoundland, is slightly smaller in number than in 1950, the production is expected to be at least equivalent to the 1950-output. [1]

By and large, prices for salted cod in 1950 may have been about 10 percent below the 1949 level. Canada experienced difficulties in sales to soft currency countries, but, in most countries, selling was relatively easy.

The tendency for salted fish prices to fall in 1950 may well be attributed to the fact that " . . . . total consumption in 1949 has failed to keep up with production to the extent to which it did in 1938. " [2] During early 1951, however, the price increase out-balanced the decrease in 1950.

(*e*) Canned Fish

It has been estimated that about 1.3 million metric tons or some 5 percent of the world catch was canned in 1949. The limited evidence available indicates a slight increase in these figures for 1950.

[1] *La Pêche maritime., la pêche fluviale, et la pisciculture*, Vol. 30, No. 877, Paris, France. 15 March 1951, p. 108.

[2] *Review of Salted Fish Production and the European Markets, 1949-50 Season.* Hawes and Company (London) Ltd., London, England, p. 6.

(i) *Tuna*

In the U.S.A., which is the largest producer of canned tuna as well as the principal market for this product, prewar landings were some 97,000 tons in 1940 and, after the decline, due to war circumstances, down to 55,000 tons ; in 1942, landings increased rapidly to break each year, from 1946 onwards, all preceding records and to reach some 180,000 tons in 1950. Imports of fresh or frozen tuna into U.S.A. for canning showed a similar trend. As virtually all the supplies from imports as well as domestic landings are used by the canneries, their output reflects the general postwar upward surge. In addition to increased supplies placed on the markets by domestic canneries, imports of canned tuna and bonito rose considerably after the decline during the war years, especially in 1950.

The strong flow of domestic as well as imported supplies caused canned tuna prices to remain fairly stable during a period of general price increase and inflation caused by the Korean conflict. The wholesale price for light meat canned tuna (with 1947 = 100) stood in January 1951 at 96.9 compared with 92.7 in January 1950. The prospect of heavy landings during the 1951 season, which will result in an even bigger 1951 pack, together with relatively larger imports, tends, to cause an unsettled market, which is facing a moderate demand and a strong supply.

In February 1951, the canned pack was 485,400 cases (4,300 tons), and the total for January/February 1951 was over 1,000,000 cases (8,800 tons) compared with 509,000 cases (4,500 tons) for January/February 1950.

(ii) *Salmon*

About 95 percent of the world's canned salmon pack emanates from catches in the North Pacific. The main canning centers are located in Canada, the U.S.A., Japan and the U.S.S.R.

Excluding the U.S.S.R.'s production, the world pack of canned salmon from the U.S.A. (including Alaska), Canada and Japan was 124,200 tons in 1950 compared with 151,900 in 1949.

The U.S. 1950 pack of 91,400 tons was the lowest since 1921. In that year the economic crises due to meager catches caused the closing of many canneries. In 1950, the decline was brought about by the failure of the salmon runs in several regions of Alaska and in the Fraser River (Canada). The landings of salmon and similar species in the U.S.A. (including Alaska) dropped from 299,900 tons in 1938 to 213,200 tons in 1949 and 149,700 tons in 1950.

The small 1950 pack and the pressures caused by the Korean war resulted in a sharp rise in prices between mid-July and mid-August 1950. The wholesale price index (1947 = 100) was 106.0 in July 1950 and 136.1 in August; by November and December 1950 the index stood at 154.1. By mid-December, 1950 the retail price index for canned pink salmon was 456.4 percent of the 1938-39 aver-

age; this 1950 figure is 26.8 percent greater than in mid-December 1949. The canned salmon supplies are light as a result of the reduced 1950 canned pack, and a strong demand is a strengthening factor where prices are concerned. It has also been stated that the 1950 output was "a high standard pack" as a result of better quality fish and improved packing methods.

By April 1951, canned salmon vendors encountered resistance to the prevailing high prices. The 1951 pack might well entail higher costs and competition might also be stiffer from other canned fish.

(iii) *Clupeidae Species*

In the U.S.A., the canned packs of both Californian pilchards and Maine sardines showed increases in 1950 when compared with the 1949 output; Californian pilchards amounted to 108,000 tons compared with 77,000 tons and Maine sardines 35,000 tons compared with 28,000 tons. The analysis of catch results for 1950 appears to suggest that landings of Pacific pilchards may be less favorable for the 1951/52 season. The 1950 pack, large by postwar standards, kept the market fairly steady in the face of a moderate demand. The wholesale price of Californian pilchards in tomato sauce increased 10 points between January 1950 and January 1951 when it reached 74.1 compared with 1947 = 100. The wholesale price index for Maine sardines, keyless, in oil, dropped during the year from 71.1 in January 1950 to 60.8 in January 1951.

1950 imports of canned sardines, especially products in oil, increased sharply over the 1949 level from 7,000 to 10,000 tons. It is reported that the heavier imports caused difficulties on the domestic market. However, exports appeared to ease the situation.

Provisional estimates indicate that the French Moroccan catch (principally sardines for canning) will exceed the 100,000 metric ton level as compared with 96,300 tons in 1950, 55,800 tons in 1949, and 30,300 tons in 1938. It appears that canned pack will likewise be higher than in 1949.

In Spain, decontrol of prices of canned fish products has encouraged a substantial increase in the processing industry. It is reported that the total output for 1950 was some 13,000 tons over the 1949 figure (48,830 metric tons). The species of fish processed are, by order of importance, small tuna, tuna, bonito, sardines, anchovies and horse-mackerel. At the end of December, 1950, through the efforts of the National Fish Syndicate, authorization was given for the preparation of canned bacalao (salted cod) "in tomato," and "a la vista." [1] In Portugal, the main characteristic of the 1950 season was the re-appearance of sardines off the coast after a two years' crisis. As a result, landings increased by 80 percent, although the exports, when

[1] *Foreign Trade*, Vol. 9, No. 233, Department of Trade and Commerce, Ottawa, Canada, 16 June 1951.

compared with the calendar year, only showed a rise of 3.5 percent. This was principally due to the increase in the canning of sardines in oil or sauce (almost one million cases more than 1949). The production of sardines, anchovies, mackerel and tuna in brine shows a slight increase of 9 percent compared with 1949. Although the outlook for the catches of sardines may be considered exceptionally good for the 1950 season, the canning industry faced extra difficulties, not only as a consequence of the Korean war, which brought a sudden stop to all the usual deliveries of tin-plate to Portugal, but also because of restrictions on their traditional foreign markets : Germany (Fed. Rep.), France, Finland, Greece, etc.

(*f*) Herring and other Clupeidae Species, Salted

The over-all production of 16 countries revealed a drop from 570,000 tons in 1949 to 445,000 in 1950. The output of the smaller producers remained stable, or even rose. Of the larger producers, only the Netherlands remained constant : 1949 : 73,000 ; 1950 : 78,000 tons. Japan, Norway and the United Kingdom experienced sharp declines in their salted herring and sardine production. Japan's output dropped from 193,000 tons in 1949 to 131,000 tons in 1950 ; Norway's from 115,000 tons to 58,000 tons. The United Kingdom's decrease was less acute but nonetheless significant: 75,000 tons in 1949 to 57,000 tons in 1950.

The Netherlands in particular, and the United Kingdom to a lesser extent, are dependent upon the demand for edible herring. Norway, with an oil-and-meal industry, is more responsive to changes in the prices of edible salted herring. Any unfavorable trends in these markets cause the trade to channel herring landings into the reduction plants, hence, the decline in the 1950 salted herring output in Norway was not caused by smaller landings. A more favorable outlook points to a bigger 1951 output.

(*g*) Oil and Meal

In the countries for which information is available (North America, Europe, South Africa and Japan), about 2,378,000 tons of round fresh fish and 1,138,000 tons of fish offal were reduced to oils and meals in 1950 compared with 1,770,000 tons and 1,037,000 tons respectively in 1949. As these countries represent most of the world's oil and meal production, it can be concluded that the world output expanded considerably as shown in Table 5. This was due to an increase in oil and meal plant capacity and improvements in methods, especially in the Union of South Africa, South West Africa, Angola, Norway, Iceland and the U.S.A. In other countries also, such as the United Kingdom, increased production is contemplated and parts of the programs have already been implemented. In the U. K., herring oil

production of 2,085 long tons in 1949 more than doubled the 1948 figure of 1,000 tons, and contrasted with the prewar output of only 100 or 200 tons at most. Available plant facilities, which had a capacity of 3,000 tons in 1949, are being expanded, and the long-term development scheme of the Herring Industry Board anticipates the eventual establishment of six plants and the annual production of 20,000 tons of fish oil.

In British West Africa a pilot-plant for the reduction of shark livers is to be established.

Scarcely 100 metric tons of fish oils were estimated as Chile's annual production up to 1950. However, an increase is foreseen since a number of new reduction plants were opened and others projected last year. Among the new installations was one that began operations in San Antonio early in 1950. With equipment imported from the U.S.A., the plant has a capacity of 10 tons per hour. Raw material is supplied from both Chilean and European trawlers.

The increase in the U.S. production is partly due to a doubling of the quota (from 150,000 to 300,000 tons), for oil and meal production in California. Progress was made during the year in the condensation of solubles and the by-products field in general, which is becoming an important factor in the economy of the oil and meal industry. The increase in processing facilities is developing parallel to an increase in the fleet and appears to continue into 1951.

The great interest in the clupeidae species during the last few years has been greatly stimulated by the rise in prices for fish meal and body oil. In March 1951, prices for fish body oils on the New York market, [1] which is indicative of the world trend, were 17.5 U.S. cents per U.S. gallon for "Crude Menhaden oil, Baltimore tanks" compared with 10.0 U.S. cents on 5 September 1950. On the same dates, prices for "Sardine, Pacific Coast, crude" were 18.5 and 10.0 U.S. cents respectively. Weekly quotations on the New York market also show that there was an increase in fish liver oil prices, but not as marked as for body oils. Annual averages for oil prices in the U.S.A. were given as below: [2]

Type of Oil	1938	1945	1946	1947	1948	1949
	(..... U.S. $ per U.S. gallon .....)					
Herring	0.28	0.67	1.22	1.07	1.10	0.55
Pilchard	0.30	0.67	1.41	1.27	1.06	0.47
Menhaden	0.28	0.68	0.93	1.35	1.16	0.41

[1] Daily records in FAO of quotations cited in *Journal of Commerce*, New York.

[2] *Fish Meal and Oil Industry, International Yearbook*, Vol. 3, No. 4, New Orleans 12, Louisiana, U.S.A., pp. 28-29.

Trends in fish meal prices on the basis of monthly averages for "bagged 65 percent protein Californian sardine meal" as recorded in Los Angeles, California, can be shown as follows :

Fish Meal Prices	1938/39	1947/48	1948/49	1949/50	1950/51
	(..... U.S. $ per ton. .....)				
Average for 12 months (Oct.-Sept.).	43.12	155.91	182.25	150.85	—
December only	42.75	178.10	144.10	172.25	125.95

Prices showed a marked increase after the wartime ceiling was abolished, and reached a maximum annual average of U.S. $182.25 per ton in 1948/49 and the highest monthly average - U.S. $263.60 in May 1950. In the U.S.A., the price ceiling for fish meal, scrap, solubles and specialty feed products became effective on 29 May 1951.

(*h*) Sauces and Pastes

Appreciable quantities of sauces and pastes are prepared in the countries of south-east Asia in addition to the dried and salted forms. The output of the latter commodities are still on a lower level than in previous years because political disturbances have dislocated international trade. Although in some instances the prewar sources of fish for drying and salting have partially been used for processing to pastes and sauces, the production of these commodities is probably still low because of internal political troubles.

VI. External Trade

According to FAO estimates some 20 to 30 percent of the world's fish catch is subject to international trade. Tables 4 and 5 show, in summary form, the trends in exports and imports of certain products. Unfortunately, it was impossible to obtain data on external trade through 1950 for a great number of countries, but it is felt that the Export Table, which includes some of the most important exporting countries, is fairly representative. The information contained in the Import Table is of a more fragmentary nature. Both Tables are entirely confined to the Northern hemisphere. There is a significant drop in exports of fresh and frozen products from about 580,000 tons in 1949 to 390,000 tons in 1950 or only about 50,000 tons more than in 1938. Trade volume for dried, salted or smoked

fish was only slightly reduced. Canned fish shows a 5 percent increase; crustaceans and mollusks dropped slightly; fish oils and fish meals and fertilizer increased considerably by 32 percent and 144 percent respectively.

Owing to the lack of dollar currency, many of the world's fish importers were obliged to reduce their purchases from Canada last year. Canada was, therefore, more dependent on the U.S. market. The total value of her fish exports to all markets amounted to 118.5 million Canadian dollars compared with 106.1 million in 1949. [1]

The way in which Sweden's [2] external trade developed in 1950 has been a matter of great concern to the interests involved. Net exports of fisheries products, which amounted to 13.0 million S. Kr. in 1949, fell to 3.5 million S. Kr. in 1950. This was due to an increase in imported goods and a slight drop in the export value. However, the value of Swedish fishermen's direct landings in foreign ports increased from 7.1 million S. Kr. to 8.7 million S. Kr.

By the beginning of 1951, the reconstruction of the fishing fleet in Western Germany had developed so well in relation to their present domestic market that certain trawlers landed fish in the United Kingdom.

Canned food exports from Japan in 1950 totalled 2,117,801 cases, or about three times that of 1949. Crab meat (taraba) comprised 89,544 cases (46,266 cases in 1949) ; tuna in oil 841,362 (149,606) ; skipjacks in oil, 841,362 (149,606) ; sardines in tomato, 200,186 (79,960). 1,567,106 cases, or over four times 1949's figure, went to the U.S.A. ; 73,244, to Hawaii ; 182,610, or more than twofold, to Africa ; 53,241 to the United Kingdom, and 10,322 to Formosa. [3]

The volume of trade in fisheries products in Asia and the Far East, apart from Japan, is still very limited as compared with prewar conditions. Singapore, for example, was the chief market for the salteries of Malaya before the war and the major part of Malayan exports of salted fish also passed through that city. In addition, Singapore imported principally from Indo-China and Thailand and exported to Indonesia, Malaya, Burma and Sarawak. Before the outbreak of World War II, the imports of dried-salted fish into Singapore amounted to some 45,000 to 51,000 tons annually, excluding approximately 20,000 tons from Malaya; the exports were between 48,000 and 53,000 tons annually, excluding about 12,000 tons to Malaya.

The postwar years show a radical change. Imports from all countries, including Malaya, declined from 18,000 tons in 1947 to

[1] *Trade News*, Vol. 3, No. 9. Department of Fisheries, Ottawa, Canada, March 1951, p. 11.

[2] *Svenska Västkustfiskaren*, Vol. 21, No. 10, Fiskhammen, Göteborg, Sweden, 25 May 1951, p. 200.

[3] *The Oriental Economist*, Vol. 18, No. 427, Tokyo, Japan. 10 March 1951, p. 208.

9,000 tons in 1949 and exports dropped from 13,000 tons in 1947 to 7,000 tons in 1949. An improvement in imports in Malaya (including Singapore) is noticeable in 1950-51. The postwar decline in the Far East, reflected in a drop in the number of transactions involved as well as in the volume handled, appears to be principally caused by dislocations in the postwar economy of the region: trade restrictions, currency and exchange controls, a decline in the effective demand ensuring profitable returns, etc. It has been said regarding this international trade : " The present position of the industry is critical and further investigation into the causes of its decline is necessary. "

In French Morocco [1] the industry hopes for increasing success in the German and U.S. markets. Sardine exports to the U.S.A. possibly exceeded U.S. $ 200,000 as compared with U.S. $ 50,000 in 1949.

In Latin America, some nations have applied several protective measures to the imports and sales of foreign fish commodities and others have enacted new fishery regulations. Imports are still subject to licences and increased taxes, except for the foreign countries with trade agreements. In most of Latin America the former markets

TABLE 3 — PRODUCTION OF CERTAIN FISHERIES COMMODITIES AS PRODUCED, 1946-50

COMMODITY	No. of Countries	1946	1947	1948	1949	1950
		(..... Metric tons [1] .....)				
Fresh fish [2]	14	...	3 622 943	2 884 034	2 965 501	3 238 917
Frozen fish [2]	14	...	...	361 308	427 607	375 452
Cod, hake and similar species, wet-salted and dried-salted [3]	13	185 387	254 670	215 459	258 702	322 000
Cod, hake and similar species, dried (stock-fish)	3	17 540	17 425	16 515	10 594	18 597
Herring and similar species, salted [4]	16	516 220	462 465	506 533	569 896	444 699
Salmon, canned	4	130 581	156 595	133 909	151 866	124 214
Herring and similar species, canned	19	242 042	254 699	259 040	323 079	379 526
Tunas, true mackerels and similar species, canned	10	80 801	96 558	110 455	101 084	138 990
Cod-liver oil	8	33 314	38 123	31 657	33 981	30 556
Oil from herring and similar species	6	103 302	113 367	124 657	100 240	151 800
Meal from herring and similar species	8	223 624	227 758	301 878	261 234	348 733
Other fish meal [5]	11	126 760	152 207	177 808	231 284	253 731

Source : Official communications.

[1] Product weight.
[2] Frozen fish is included with fresh fish for Netherlands, Newfoundland and Norway for 1947.
[3] Dried basis.
[4] Includes smoked herring for some countries.
[5] Includes herring meal for Denmark, Germany (Fed. Rep.) and the United Kingdom.

[1] *Commercial Fisheries Review*, Vol. 13, No. 2, United States Department of the Interior, Fish and Wildlife Service, Washington, DC., U.S.A. February 1951, p. 54.

for dried and salted cod are gradually recovering. There is also a trend towards increased consumption of canned salmon and sardines which emanate chiefly from Canada, the U.S.A., France, Spain and Portugal.

TABLE 4 — EXPORTS OF CERTAIN FISHERIES PRODUCTS FROM PRINCIPAL EXPORTING COUNTRIES, 1938 AND 1946-50

COMMODITY [1]	No. of Countries	1938	1946	1947	1948	1949	1950
		(..... Metric tons .....)					
Fish, fresh or frozen	8	339 256	406 851	452 621	575 879	583 636	389 147
Fish, dried, salted or smoked.....	[2] 8	566 611	409 553	416 875	457 117	399 450	384 785
Fish, canned [3].....	[2] 9	99 786	145 310	151 458	125 836	104 850	110 076
Crustaceans and mollusks.....	7	72 409	43 080	65 792	66 652	75 182	69 579
Fish oils [4].	7	145 496	58 238	70 592	85 870	68 552	90 406
Fish meal and fertilizer.....	5	124 581	27 875	28 285	83 195	47 620	116 297
Aquatic mammal oils and fats [4]. ...	5	13 179	18 642	46 741	36 127	16 959	15 264

Source : Official publications and special reports.

[1] Includes re-exports for Norway, 1938 and 1946-48.
[2] Includes some crustaceans and mollusks for Belgium.
[3] Includes canned crustaceans and mollusks for the United Kingdom and small quantities of fresh or dried fish for Portugal.
[4] Aquatiic mammal oils included with fish oils for the Netherlands and the United Kingdom.

TABLE 5 — IMPORTS OF CERTAIN FISHERIES PRODUCTS BY PRINCIPAL IMPORTING COUNTRIES, 1938 AND 1945-50

COMMODITY	No. of Countries	1938	1946	1947	1948	1949	1950
		(.....Metric tons .....)					
Fish, fresh or frozen.....	6	320 286	419 282	417 659	542 109	539 957	369 221
Fish, salted, dried or smoked.....	6	173 857	164 221	116 307	180 893	141 371	96 717
Fish, canned [1].....	5	100 401	102 381	96 018	48 244	65 651	73 879
Crustaceans and mollusks [2].....	5	33 237	27 162	29 716	38 939	50 305	62 386
Fish oils [3].	5	174 172	50 211	71 647	87 366	76 375	...
Fish meal and fertilizer.....	3	63 327	16 513	15 002	55 971	63 355	...
Aquatic mammal oils and fats [3].....	4	299 020	77 059	171 278	160 332	173 387	...
Miscellaneous aquatic plant and animal products	4	16 220	12 672	11 459	12 807	12 709	...

Source : Official publications and special reports.

[1] Includes canned crustaceans and mollusks for Sweden.
[2] May include oysters and mussels for breeding for the Netherlands, 1938 and 1946-48.
[3] Aquatic mammal oil and fats may be included with fish oils for the Netherlands

Table 6 gives summarized export figures for eight countries during the early parts of both 1951 and 1950. One country experienced a decline, but six, a marked increase so that the over-all rise in exports was 26 percent.

TABLE 6 — EXPORTS FOR PART OF 1951 COMPARED WHIT CORRESPONDING PERIOD OF 1950 AND PERCENTAGE CHANGE

COUNTRY	PERIOD	1951	1950	PERCENTAGE CHANGE	
				Decrease	Increase
		(... *Metric tons*. ...)		%	%
Denmark	January - August	80 971	92 906	12.8	—
Iceland	January - August	109 366	78 576	—	39.2
Netherlands	January - July	61 864	50 927	—	21.5
Norway	January - August	341 607	254 082	—	34.4
Portugal	January - July	22 771	11 345	—	100.7
United Kingdom	January - July	44 136	41 997	—	5.1
Canada [1]	January - June	138 615	121 544	—	14.0
U.S.A. [2]	January - March	28 303	5 662	—	399.9
Total		827 633	657 039	—	26.0

[1] Includes Newfoundland.
[2] Includes only: Salmon canned, mackerel canned, sardines (including pilchards) canned.

TABLE 7 — TOTAL LANDINGS FOR PART OF 1951 COMPARED WITH CORRESPONDING PERIOD IN 1950 AND PERCENTAGE CHANGE

CCUNTRY	PERIOD	1951	1950	PERCENTAGE	
				Decrease	Increase
		(....*Metric tons*....)			
Denmark	January - March	65 352	59 279	—	10.2
Germany (Fed. Rep.)	January - September	380 672	360 149	—	5.7
Iceland	January - August	307 150	237 260	—	29.5
Ireland	January - August	6 017	4 856	—	23.9
Netherlands	January - July	74 649	72 116	—	3.5
Norway [1]	January - August	1 219 274	941 843	—	29.5
Portugal	January	12 211	8 095	—	50.8
United Kingdom	January - August [2]	627 772	571 750	—	9.8
Canada	January - July	295 410	306 797	3.7	—
U.S.A [3]	January - March	56 147	49 801	—	12.7
Total		3 044 654	2 611 946	—	16.6

Source : Official publications and special reports.
[1] Includes only spawning and Finmark cod ; winter, fat and small herring.
[2] January-July for Scotland.
[3] Landings for the states of Maine and Massachusetts only.

PROGRESS AND DEVELOPMENTS IN FISHERIES BIOLOGY AND FISH CULTURE

A Summary of Information to FAO in 1950 *by Various Member Governments*

AFRICA

Belgian Congo. A ten-year program for the increase of production in inland waters has been developed with emphasis on the rational management of fisheries in lakes and canals and of fish culture in ponds in the interior of the colony, mainly in regions with poor communication systems and where fish is highly consumed, such as in the Katanga region. The species *Tilapia melanopleura* and *Tilapia macrochir* give better results in pond fish culture in this area.

British East and Central Africa. In Northern Rhodesia, fish farming had passed the experimental stage. Eight full-scale fishpond units were being established at points where they would best serve as nuclei for further development. The fisheries of Lakes Bangweulu and Mweru were being studied. In Zanzibar, ten acres of marine fishponds and a smaller area of freshwater fishponds had been built. In Tanganyika, an experimental growth of rice and fish in the same pond had been started and very high yields of fish obtained ; eight acres were under production on the demonstration fish farm. Local interest was widspread. A professional fish farmer was establishing a demonstration farm in Kenya. The Lake Victoria Fisheries Board had started work on the influence of crocodiles on the yield of the fisheries.

British West Africa. In Nigeria, a professional fish farmer had been engaged and had already started work.

Egypt. A three year program aimed at organization of sea fisheries on the basis of modern techniques and developing fish culture had been planned. The Fisheries Department intended to build more fish farms similar to those established near the lakes of Mariout, Menzalleh and Karoun. Modernization of sea fisheries and further development of fish culture was expected to increase current local fish production by about 20%, that is, about 55,000 metric tons during the next three years.

Southern Rhodesia. Southern Rhodesia's first fisheries officer had arrived.

Union of South Africa. Pilchard investigations had been started by almost the entire scientific staff with the *Africana II* and two smaller vessels.

British Guiana. Junior fisheries officers had been appointed to British Guiana and were completing a training course in the United Kingdom.

British West Indies. Junior fisheries officers had been appointed to British Honduras and were completing a training course in the United Kingdom. A fisheries officer from Jamaica had completed a training course in fish culture in the Belgian Congo, Rhodesia, Malaya and Java.

Peru. The Fish and Wildlife Service was being reorganized with view to adapting, on a reduced scale, the organization of the U.S Fish and Wildlife Service to Peru. A plan for marine biology investigations and stocking inland waters with fish and crustaceans was also being developed. It was planned to organize hydrobiological services and a marine biological laboratory. Fisheries' laws and regulations were being revised. The Fish and Wildlife Service had begun publishing the review *Pesca y Caza* ("Fish and Game").

United States of America. The three Fish and Wildlife Service research vessels based at Honolulu, Hawaii, and the new laboratory there, were in full operation on biological and oceanographical studies. Two other Fish and Wildlife Service research vessels were provided for studies in the Gulf of Mexico. An extensive program to control the sea lamprey in the Great Lakes was also under way.

The U. S. Government, through the Fish and Wildlife Service, was continuing various fisheries training programs. During the year, forty Filipinos had completed training and had returned to their homes where they were now engaged in the fishing industry and governmental service. Trainees from Peru, Brazil and Colombia were studying fisheries biology and technology. Under the SCAP program, the Fish and Wildlife Service had accepted, for short periods of training, seven Japanese leaders in fisheries research and administration, each of whom had visited the U.S.A. for a period of approximately three months to get acquainted with American methods and techniques in their special fields of interest.

At the request of the Governments of Mexico and Peru, the Fish and Wildlife Service had provided fisheries advisory missions to aid the development of fisheries research and administration. Reports on missions in Panama, Venezuela and Guatemala, conducted during previous years, had also been completed.

The Pacific Ocean Fisheries Exploratory Research Program, under the Fish and Wildlife Service, was fully underway by the end of 1949. Employment in the fisheries field is expected to increase as new areas and methods are discovered for the economic harvesting of the fish crop.

British Colonial Territories in the Far East. The fostering of a fishpond industry on the peasant scale was energetically pursued. In line with the policy of working from the bottom upwards, fish culture, new to most territories, would tend to start at the level of the village pond or ponds, progressing towards larger specialized fish farms, or a combination of fish farms and rice fields.

Ceylon. The window pane oyster (placenta placenta) fishery at Lake Tamplegam was revived after a lapse of many years and nearly a million oysters were fished during the year. The fishery was to be continued in the current year. It was impossible to maintain inspection of the Mannar Pearl Banks due to the non-availability of a suitable craft.

Investigations into the decline of the brackish water fishery in the Balapitiya area resulted in the declaration of Randombe Lake as a sanctuary for three years. It was felt that this measure, together with the enforcement of suitable protective legislation in neighboring waters, would help to revive the depleted stocks and re-establish a flourishing fishery.

During the latter part of the year an anti-dynamiting organization was inaugurated to patrol areas where the dynamiting of fish was known to exist and to punish offenders. An investigation of the bionomics of the shark had been started, and the effects of under water explosions on fish stocks were being studied.

The fresh water fisheries were under investigation and a considerable number of food fishes of selected varieties, including the gourami, pearlspot and Chinese grass carp, had been transported and stocked in various inland waters. In addition, progress had been made in the conditioning of marine fish for introduction to fresh water areas, and numbers of mullet, captured in the Mannar area, had been introduced, after conditioning, into giant tanks.

The question of eorganization of the Fisheries Department and the development of the fishing industry was under consideration by the Government in 1950 with the assistance of Dr. H. Blegvad of Copenhagen, Dr. C. C. John of Trivandrum and Dr. Kesteven, FAO Regional Fisheries Officer.

India. To expand the production of fish in inland waters, considerable stress was laid on increasing the supply of fish spawn, fry and fingerlings. In Assam, fish farms had been established on a commercial basis at Gauhati, Nowgong and Sibsagar. In Madras State, nearly 28 rural fisheries demonstration units had surveyed inland waters and the state government had considered providing the Fisheries Department with the necessary transport and equipment to stock these waters with fingerlings. They expected to collect and distribute twenty million fish fry in 1950/51 and even more in 1951/52. In the United Provinces, 585 of the 1,278 new tanks selected had already been stocked.

In pursuance of the recommendations of the All-India Fisheries Conference, held in September 1948, a Fisheries Research Committee had been set up during the year under review. They had already collected information from the central institutes, state governments and universities which would be disseminated throughout the country for the use of workers. An inland fisheries training course was being conducted at the Central Inland Fisheries Research Station, Barrackpore, for technical staff employed in the various states.

Indonesia. A plan to increase production from inland fisheries called for improvement in the provision of fry, the encouragement of fish culture in irrigated fields, the reclamation of existing brackish water ponds and the laying out of new ones, and finally, the intensification of research into brackish water fisheries. In this way it would be possible to double the production of fish from ponds.

The plan envisaged the establishment, in 1950, of a regional selection station in West Java which would serve, at the same time, as a fish-culture station, whilst in 1951, similar establishments would come into being in West and East Borneo. In conjunction with the rice seed farms it would be possible to establish four fish culture stations in 1950, six in 1951, and ten in 1952, which would be tended by the regional fish culture stations.

Further work was planned on the brackish water ponds, where factors such as insufficient and irregular depth and an inadequate water supply were estimated to reduce potential production by about six million kilograms annually. It was considered possible that, by means of a new combination of two species of fish, the ponds could be kept free of malarial parasites, and production could be raised by two million kilograms in 1952. This would mean increasing it by 50 percent of the increase in the ultimate production expected from the same area. The area of brackish water ponds can be expanded substantially so that its annual production may be increased by 10 million kilograms. Fish culture will be substantially augmented by a plan for construction of artificial lakes and by the continuous supply of water to the "Sawahs," or flooded rice-field area of over 500,000 hectares.

Japan. The Head of the Department of Research and Statistics of the Fisheries Agency visited the U.S.A. to observe fisheries research facilities and organization. As part of the new research program, eight regional research stations were established. Each one would specialize in those phases of over-all fisheries problems most important to its district. The work and personnel of all stations were to be closely co-ordinated by the Central Administrative Office in Tokyo. New emphasis would be placed on population studies, collection and analysis of catch statistics and migrations and life histories of fish. Japanese administration and research personnel were encouraged to fish on the high seas and in coastal areas beyond territorial limits in accordance with international agreements and in harmony with sound principles of conservation and utilization.

Philippines. The Bureau of Fisheries had given technical assistance in the construction of many privately-owned fishponds. The fish culture demonstration station of the Bureau's regional school of fisheries at Catbalogan, Samar Province, had been started. Oyster farm sites had also been selected and developed under the guidance of technical personnel in the provinces of Palawan, La Union and Pangasinan. Stocks of fresh-water fish for cultivation purposes, like gourami and pla-salit, had been distributed to fishpond owners, government institutions, and agricultural schools in many parts of the islands.

Special appropriations for the promotion of the fisheries industry, with emphasis on the construction of three demonstration fish farm projects, had been made. The primary objective was the location of fish farms in places where there were extensive swamp lands in brackish-water areas to promote the spread of the bangos fishpond industry by inducing the people, in those regions, to convert idle swamps into productive fishponds. The construction of the first demonstration farm was already in progress.

The Philippine Fishery Rehabilitation Program, a part of the Philippine Rehabilitation Program authorized by the United States Congress in 1946, terminated on June 30, 1950, in accordance with the requirement of the legislation. Prior to its termination, however, the U. S. Fish and Wildlife Service transferred to the Philippine Government the *David Starr Jordan*, a 53-foot diesel-powered combination research and experimental fishing vessel and complete equipment for fishery biological laboratories, oceanographic laboratories and experimental fish-processing plants. The Philippine Government planned to carry on the long-term phases of the research and development program initiated by the U.S. Fish and Wildlife Service and had requested that United States' Government supply advisors from the Fish and Wildlife Service to aid promotion of such undertakings.

Thailand. In 1949, fish fry and yearlings produced at the Bangkhen, Borapet, and Kwan-payoh Pond Culture Stations had been distributed. To meet the demand of fishpond owners in Bangkok, Chinese carp fry had been imported from Hong-Kong. In 1950, 69,800 bahts had been appropriated for the promotion of pond culture in Bangkok and Dhonbury. A fund of 40,000 bahts was approved for the study of Pangasius and for prospecting nursing grounds for this fish.

The use of 2,4-D (2-4-di-chlorophenoxy acetic acid) to eradicate water hyacinths was continued at Borapet Station. A plan was under consideration to induce farmers and lessees of fishing tracts to learn the effects of 2,4-D. in the elimination of this weed by demonstrations in the province of Pichit. The Department of Fisheries was cooperating with three provincial agriculture schools with a view to using them as subsidiary centers for distributing fish fry to the people and teaching students pond-culture practices. Two inland fisheries co-operatives were set up in 1950 to obtain fisheries privileges and to encourage fish conservation.

Because of future possibilities for brackish water fish culture, an investigation to locate Chanos or milkfish fry grounds was carried out in 1950. Chanos fry and fingerlings in large numbers had been found in Prachuab Kirikan Province and Chantaburi Province. It was hoped that technical aid from FAO to formulate a development scheme of Chanos cultivation on a large scale would be obtained. Experiments on spat collecting were being tried at Pranbury under the joint supervision of fisheries officers from the FAO Regional Office and the Department of Fisheries.

The construction of a 60 ton investigation vessel was expected to be completed by December 1950. Contacts had been made with the Royal Navy to use this boat in the study of platu (Rastrelliger), important to the marine fishing industry.

Europe

Austria. During 1949, the re-establishment of Austrian fisheries had made great progress. Fish cultural and breeding stations had been developed and improved; abandoned ponds had been partially reactivated and new ponds constructed according to existing requirements. The fish breeding station in Kreuzstein (Mondsee, Upper Austria) began functioning on 15 June 1950. The Wallersee (Salzburg) station for initial growth of fry ("Vorstreckanlage") had also been completed. In the autumn of 1949, most of the 89 salmon breeding establishments had begun to increase considerably production of fry for restocking Austrian waters. It was planned to transform the Federal Institution for Fisheries Biology in Weissenbach (Attersee) into a teaching and research institution for fisheries and to construct a new research and school building in Scharfling (Mondsee), near Kreuzstein.

Belgium. In 1949, the Government carried out extensive restocking of the rivers with roach, carp, tench and trout. A law for the protection of waters against pollution was passed on 2 March 1950. In 1949 also, special six-month courses had been given to administrators preparatory to an examination to receive a certificate for fisheries instruction. This course included instruction on seamanship and equipment, fishing methods and fisheries biology.

Finland. The planting of fry had been intensified throughout the country and the building of two fish breeding stations begun, one for South Finland and the other for Lapland. Besides the work performed by several private scientists, research was carried out mainly by the Experimental Division of the Fisheries Department at the Board of Agriculture and the Fisheries Foundation. In 1949, the latter founded an experimental station for inland water fisheries research in connection with an already existing fish breeding station in south-west Finland. Its activities during the year had been limited to the erection and equipping of laboratories and to local basic

research in view of future experiments. Research of the Fisheries Department had concentrated on studies of migrations of Baltic herring shoals and exploration of the Helsinki water area.

France. Scientific studies had resulted in an extension of the tuna fishing season.

A special effort had been made to emphasize the value of inland waters. All Waters and Forests Services had been instructed to carry out a fish culture management program of national and regional interest beginning 1 April 1951. This program included the protection of existing fish populations, eventual purchase of boat-mowers to clear fishing areas of aquatic vegetation, management of the natural fish breeding places, collection of fish fry apt to be lost when the water was low, establishment of channels for migratory fish, and the re-stocking of the water courses. Special attention was being given to the production of salmon eggs and it was felt that grayling and pike should also be developed. Work along these lines had already begun, for example, the dams in Deux-Sèvres and the Charentes, the management of breeding places and collection of fry in the marshes flooded periodically by the Loire at Ancenis, the creation of a fishway in La Bajasse Dam at Brioude on the Allier, and another pass in the important Bec des Deux Eaux Dam on the Vienne.

Ireland. Special steps had been taken to develop the brown trout fisheries mainly as a tourist attraction. A body to be known as the Inland Fisheries Trust was being formed to acquire these fisheries, which could be developed but which were at present neglected. Schemes were in progress to test the results of adding fertilizers to lake waters and to remove predatory fish on the trout angling potentialities of lakes in which water conditions were favorable for the development of trout but which contained other fish in undesirable numbers.

Italy. The following steps had been taken to increase production in internal waters : construction of fish culture stations at Marina di Pisa, particularly suitable for the collection and growth of small eels for the re-population of lakes and lagoons and at Capodimonte and Bolsena, and systematic research by the Central Hydrobiology Laboratory of Rome on artificial lakes with a view to exploiting them.

Norway. Outdated oceanic research equipment was gradually being replaced. Because of limited equipment, the Institute for Ocean Research mainly concentrated its work on routine observations of the sea and its fisheries. Since early 1950, the ocean research vessel, *G. O. Sars*, had dealt with special problems. Investigations on the periodic variations in the herring fishery and extensive marking experiments had been carried out.

Sweden. In September 1949, new regions had been set up for state fisheries' superintendents on the basis of the extension of the water systems rather than provincial administration insofar as fresh water fishing was concerned. This was the realization of a long cherished desire in many countries to organize fishing on the basis of a whole river area under one management.

In regard to fresh water fishing, in recent years efforts had been increasingly concentrated on investigations into the usefulness of fish breeding and implantation. As a result there had been some hesitation as to whether such measures were worthy of recommendation since, in some cases at least, grave doubts existed as to any noticeable rise in production.

Turkey. A research laboratory, attached to the university, was set up in Istanbul to carry forward studies on fisheries in Turkish waters.

United Kingdom. On 4 July 1950, the Prime Minister announced that legislation would be promoted to set up a White Fish Industry Authority with adequate powers to regulate, re-organize and develop the industry.

Yugoslavia. The Five Year Plan provided for expansion of existing artificial ponds and the construction of new ones for fish culture, especially carp.

Oceania

Australia. The Queensland Department of Harbors and Marine built a marine biological station at Dunwich, Stradbroke Island, in Moreton Bay. The living quarters had been occupied in March 1949, but the laboratory was not usable until the following November. The staff of the station consisted of one research officer, a technical assistant for field work on oysters and mullet, and an assistant for hydrological analysis. The principal work of the station was investigation of the spawning migration of mullet and some features of the sand crab industry, the development of the oyster industry in Moreton Bay and the distribution of prawns. The Fisheries Division's work at the field station on Thursday Island remained at a preliminary stage because the building of the laboratory and aquarium was incomplete.

Netherlands New Guinea. Research stations had been established at Sorong and Hollandia and more were under consideration.

New Zealand. The research program included the analysis of fish populations to determine the most productive and economic size necessary for commercial operation, the investigation of power net

operation regarding the fish population to ensure adequate escapement of immature and uneconomic sizes, and the survey for indications of new grounds.

Territory of Papua and New Guinea. An important stage in the development of the fisheries industry was reached with the completion of a variety of survey operations. This included completion of the Marine Fisheries Survey by the M. V. *Fairwind* investigation in May 1950 in the vicinity of Kairuku, Port Moresby, Laë and Angoram of indigenous fisheries resources by an inland expert from Indonesia, who had also advised on the possibilities of using pond farming methods; and a study by a food preservation specialist during April-June 1950, of native methods of fishing and fish-preservation in various localities, including Trobriand Islands, Goodenough Island, Samarai, Abau, Port Moresby, Rabaul, Manus Island, Laë and Angoram.

Horacio Rosa, Jr.

LATIN AMERICAN FISHERIES TRAINING CENTER 6 JANUARY-20 MARCH 1952, VALPARAISO, CHILE

One of the greatest drawbacks towards developing and utilizing fisheries, not only in Latin America but in most of the world, is the lack of personnel trained in fisheries biology, technology, economics and administration. In order to help meet this deficiency it is proposed to establish a Latin American Training Center where, by means of intensive courses, theoretical and practical training will be given in the various activities of fisheries and related industries. The Center will operate at the Santamaria Technical University in Valparaiso, Chile, from 6 January to 20 March 1952.

The objectives of the Center are twofold: firstly, to give special assistance to Latin American governments to improve the administration of their fisheries agencies; and secondly, to contribute to the training of experts who may be employed in the fisheries industry and research institutions. The number of trained personnel required by Latin American countries is comparatively large. However, the number of experts needed to teach fishery subjects is relatively small. Moreover, the time which members of both groups can give for teaching or studying at a training center is very short. For these reasons, it appears advantageous to convene a selected group of them in one suitable place for a short period and organize an *ad hoc* training center.

The Center, the first to be organized in Latin American, will be established under the auspices of FAO, in compliance with resolutions passed by the second Latin American Meeting on Food and Agricultural Programs and Outlook (Montevideo, December 1950). It

Sweden. In September 1949, new regions had been set up for state fisheries' superintendents on the basis of the extension of the water systems rather than provincial administration insofar as fresh water fishing was concerned. This was the realization of a long cherished desire in many countries to organize fishing on the basis of a whole river area under one management.

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The Center, the first to be organized in Latin American, will be established under the auspices of FAO, in compliance with resolutions passed by the second Latin American Meeting on Food and Agricultural Programs and Outlook (Montevideo, December 1950). It

will be conducted through facilities supplied by the Expanded Technical Assistance Program of the United Nations and specialized agencies, the Chilean Government, the Santamaria Technical University, at Valparaiso, and through aid from international agencies and participating governments, who will supply instructors.

The Center is designed primarily to serve students from Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, the Guianas, Paraguay, Peru, Uruguay and Venezuela. If other Latin American countries wish to send students to the Center, efforts will be made to accommodate as many as possible, consistent with the limited facilities available.

The curriculum of the Center will include some subjects of general interest and others designed primarily for students wishing to specialize in one or more of the fields of fisheries biology, technology or economics. Individual courses will be adjusted to basic training and to the responsibilities participants have, or eventually may have, in their respective countries. Instruction will consist of lectures, seminars and demonstrations. Their application to practical and useful projects will be stressed. As far as possible, all lectures will be given in Spanish or interpretations will be provided. They will also be published in Spanish and made available to all students. Conducted tours of commercial fishing and processing enterprises will also be arranged.

The following courses will be offered:

Biology : Essentials of Oceanography ; Economically Important Families of Fishes; Economically Important Mollusca and Crustacea; Marine Fisheries Management; Fresh Water Fisheries Management; and Fishes and Mankind.

Economics : Economic Geography of Latin America ; Principles of Fisheries Economics ; Latin American Fisheries ; Fisheries Administration ; Fisheries Statistics ; Fishermen's Associations and Economic Appraisal of Fisheries and Allied Projects.

Technology : Introduction to Fishing Industries ; Fishing Methods, Craft and Gear ; Handling, Refrigeration and Storage of Fresh Fish; Freezing, Canning and Curing of Fish ; Preparation of Fish By-Products ; Fishery Commodities Sanitation.

Seminars : General Survey of Fisheries Work ; Introduction to Fisheries Literature, and Fisheries Extension Services.

The educational work of the Center will be conducted under the chairmanship of the Director of Fisheries and Game of Chile, assisted by a co-director, designated by FAO. If it appears useful, a Board of Regents to perform advisory functions will be set up by agreement between the Chilean Government and FAO with representation from participating Latin American countries, including diplomatic envoys of such countries.

Participants :

(a) *Requisites.* The Center will be established to train government officials who presently hold, or hope to hold, responsible positions within the official fisheries agencies of the various countries. Such officials would include administrators, members of field staffs and extension and research workers. Preference must be given to those officials who have the best background and training so that participants may be able to benefit from the courses offered. Every participant should have completed, at least, a high school education. Under certain conditions this qualification might be waived. The Center will also be open to qualified persons engaged in the processing and marketing of fishery products as well as to graduates of universities and higher technical schools, teachers, and naval officers interested in fisheries development. Both male and female candidates will be considered.

(b) *Selection of Students and Expenditures.* The Governments of the participating countries will select the students and defray their travel and subsistence expenses, except for scholarship students, as noted below. In order to encourage attendance at the Center, FAO will grant, for each country taking part in the work of the Center, a number of scholarships equal to the number of students sent by the respective government. The travel and subsistence expenses of the participants selected for an FAO scholarship will be paid by FAO. Nominations for FAO scholarships will be made by the governments of the participating countries to FAO.

(c) *Number of Participants.* There will be facilities for about 50 students. FAO will issue invitations to South American governments to send students to the Center. It is possible that the number assigned to each country might be increased, after consultation with FAO, if the quotas of some countries participating in the Center are not filled. FAO expects to have a tentative list of participants by 1 October 1951 and a final list by 1 December 1951.

At the conclusion of the Center, certificates will be issued to the students stating the proficiency attained and any specialization. It is proposed that, at the conclusion of the Center, five fellowships should be awarded to the most outstanding students for further study. The present or future responsibilities of the candidates for fellowships within their respective countries will also be considered.

B. F. O. T.

PORTUGAL ESTABLISHES AN INSTITUTE OF MARINE BIOLOGY [1]

Fisheries research in Portugal has been carried on since 1919 by a Marine Biological Station (Estaçao de Biologia Marítima) in cooperation with the Vasco da Gama Aquarium under the name "Aquário Vasco da Gama - Estaçao de Biologia Marítima," in Lisbon. To enlarge its technical and scientific program, the Portuguese Government recently separated it from the Aquarium, and today, it operates as an independent institution called Institute of Marine Biology (Instituto de Biologia Marítima) with its own headquarters in Lisbon. The Institute is directed by an Administrative Council whose President, Dr. Alfredo de Magalhães Ramalho, is also the Director of Investigations. There are two permanent posts for investigators.

A program of work for the management of the Portuguese fisheries is now under discussion by the Institute and various local commercial fisheries organizations. Arrangements are being made to contract three students, not on the permanent staff, to be trained in the study of the biology of pelagic and demersal species and the collection and analysis of biological statistics and biometric data. Provisions have been made by the Portuguese Government to acquire eventually a research vessel for studies of fisheries biology and fishing.

The former Marine Biological Station had published, by the end of 1950, 53 scientific papers on fisheries biology, marine biology, oceanography, taxonomy and technology. It had also published, in 1943, a translation by Dr. A. de M. Ramalho of the book by E. S. Russell, *The Over-fishing Problem*, under the Portuguese title, *O Problema da Sobrepesca*. With its new and broader organization, it is expected that a still larger number of scientific contributions will be published.

Although the Vasco da Gama Aquarium is now an independent educational organization, it plans to maintain close technical colaboration with the Institute. The Aquarium is being modernized.

Portugal, a traditional fishing country, has 800 kilometers of coast, rich in fisheries resources, and indeed, fisheries are second only to agriculture in the economy.

The newly organized Institute will certainly be an important factor in the further scientific development of the Portuguese fisheries resources.

H. R. Jr.

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[1] Information supplied by Dr. A. de M. Ramalho, Director, Instituto de Biologia Marítima, Lisbon, Portugal.

FISHERIES RESEARCH IN YUGOSLAVIA[1]

Along the Yugoslav coast are several oceanographic and sea fisheries reseach stations devoted to the investigation of the fauna and flora of the Adriatic Sea. Studies are made, not only from the theoretical point of view, but also from the point of view of the practical needs of Yugoslav fisheries. Biological experiments and technological experiments, including the mechanization of fishing craft and improvement of the gear of the country, are carried out. Of particular importance to Yugoslav fisheries is the conservation of its resources. Thus the stations are engaged in surveying and charting winter fishing grounds of blue fish, sardines, mackerels, and tuna ; in studying regulatory measures to avoid overfishing ; and in studying types of gear to avoid the use of harmful gear.

The stations are under the supervision of the Institute for Oceanography and Fisheries in Split. The Institute, founded in 1930 in Zagreb by the Yugoslav Academy of Science and Art, has three sections-physiological, biological, and ichthyiological. It also offers practical fisheries biology courses for university students and publishes scientific papers in its ACTA ADRIATICA.

A station in Rovinj, Istria, rebuilt in 1947, is devoted to research in the northern part of the Adriatic while a station at Dubrovnik, Ragusa, built in 1946, deals with problems of the southern Adriatic. A station in Ston Mali, near Dubrovnik, is engaged in scientific investigations and culture of oysters, crabs, and sponges.

Fresh water fisheries research is done mainly at the Institute for Fresh Water Fisheries in Zagreb, Croatia, and a hydro-biological station on Lake Ohrid. The former, founded in 1948, is investigating possibilities for expanding production of fresh water fish throughout Yugoslavia ; the latter, founded in 1934, is devoted mainly to limnological studies of Lake Ohrid and artificial propagation of fish.

[1] Based on information supplied by P.B. Sambrailo, Zagreb, Yugoslavia.

Conferences and Meetings

THIRD MEETING OF THE INTERNATIONAL WHALING COMMISSION

The International Whaling Commission held its third meeting in Cape Town, Union of South Africa, 23-27 July, 1951. Recent statistics on whaling operations in general, and Antarctic pelagic whaling in particular, were reviewed, together with scientific reports. A number of changes in the Schedule of the International Whaling Commission were decided upon (subject to approval by member countries).

The following countries have now ratified, and will adhere to, the Whaling Convention : Australia, Brazil, Canada, Denmark,[1] France, Iceland,[1] Japan, Mexico,[1] Netherlands, New Zealand,[1] Norway, Panama, Sweden, Union of South Africa, United Kingdom, U.S.A. and U. S. S. R.; observers were present from Argentina, Italy and Peru as well as from FAO. (Mr. G. M. Gerhardsen) and the International Council for the Exploration of the Sea.

G. M. G.

FOURTH INTERNATIONAL CONGRESS OF THE SEA

The Fourth International Congress of the Sea was held in Ostend, Belgium, 20-22 July 1951, under the presidency of Mr. H. de Vos, Director-General of the Belgian Marine. The work was divided into eight Sections: Merchant Marine and Marine Publicity ; Marine Fisheries Industries ; Mechanical Arts and Marine Industries (the activities of this Section constituted the Second International Congress of Naval Engineers); Sciences of Sea Biology; Oceanography; Marine History and Archeology; Marine Literature and Arts of the Sea; Medical, Climatic and Nautical Sciences. Specialists were present from Belgium, France, Great Britain, Norway and the Netherlands. Numerous papers were presented in the various Sections. Particularly interesting were the discussions on over-fishing and detection of fish by echo sounding. Demonstrations of various echo sounders and radar equipment were given.

The closing session was devoted to recommendations and resolutions of the various Sections and was presided over by Mr. P. Segers, Minister of Communications. Delegates to the Congress also attended the inauguration of the new fish market.

FAO was represented by Mr. Jacques Chaux and Mr. Jan-Olof Traung.

J. C.

[1] Not represented at the Third Meeting.

Fisheries Division Activities

Dr. Kesteven, Regional Fisheries Officer for Asia and the Far East, attended the meeting of the Executive Committee of the Indo-Pacific Fisheries Council (IPFC) in Singapore 16-20 July 1951. The Committee considered the many measures arising out of the decisions of the IPFC at its third meting at Madras, India. The Committee also spent much time in discussing a proposed establishment of an Asian training center for master-fishermen which, it is hoped, will be set up in Singapore in the near future.

Mr. Gertenbach, Fisheries Economist, and Mr. Traung, Naval Architect, of the Headquarters' staff are at present in the Far East. Mr. Gertenbach is visiting several countries in that region in an effort to obtain recent fisheries statistics and other background material for economic appraisals and to explore the possibilities of strenghthening the national fisheries statistical programs. His work is closely allied to the statistical program of the IPFC. Mr. Traung's work centers largely in Ceylon and Pakistan where he is advising on motorization of fishing boats and improvements in the efficiency of craft and gear generally. He is also assisting the IPFC in its work on the classification and description of fishing boats in use in the region. It is expected that several projects under the Expanded Technical Assistance Program will develop from Mr. Traung's work there.

Fisheries Technological Co-operation in Europe

As previously reported in the *FAO Fisheries Bulletin*, (Vol. 3, No. 6, pp. 144-45), it was decided at the FAO Meeting of Fisheries Technologists in Bergen, in September 1950, that an attempt should be made to establish a permanent committee of fishery products technologists for north-western Europe. This work has been somewhat delayed due to the move of FAO to Rome, but FAO is now contacting the members of the Interim Committee, elected in Bergen, with a view to formulating a concrete proposal for a permanent committee and to arrange working groups to operate in special fields of fisheries technology aud particularly in the following:

(1) Development of herring products for Africa and the Far East.
(2) Prepacked herring products.
(3) Chilling of fish at temperatures close to the freezing of the flesh.

It is hoped that a report on the progress of this work will be presented to the Sixth Session of the Conference of FAO in Rome, in November 1951.

Expanded Technical Assistance Program

The following is a summary of current fisheries projects being carried out under the Expanded Technical Assistance Program (ETAP). It covers mainly those projects for which FAO has formal agreements with the government concerned. Requests for technical assistance have also been received from other countries, including Israel, the Philippines and Portugal, which are currently under consideration. The Latin American Fisheries Training Center described on page 29 is also an ETAP project.

Brazil. The project in Brazil calls for a reconnaissance survey of the fisheries and their industries to determine which types of projects would be most desirable to improve methods and techniques and to increase the harvest for domestic consumption. Dr. C. J. Bottemanne of the Netherlands has been selected for this work. He has had wide experience in fisheries' administration and was for many years Head of the Sea Fisheries Institute in Indonesia. This Institute was instrumental in pushing forward a program for mechanizing the fishing fleet there, developing markets for sales and effecting measures to improve the social welfare of fishermen and their families. The survey in Brazil is expected to begin during the latter part of August and to last for three months.

Chile. The aim of the project in Chile is to develop a program for the conservation and management of the extensive hake fishery and for the wise use of the hake harvest. Dr. Erik M. Poulsen, Chief of the Saltwater Section of the Danish Biological Station, will handle the biological phases of this program. He will work with FAO for six months and report to Chile in September.

Mr. John Fridthjof, who is now in Chile, will assist for a period of six months in developing methods for increasing the domestic consumption of hake. His work will likely resolve itself to the planning of a fish promotion campaign. Mr. Fridthjof has had extensive experience in this field in Denmark where he assisted the Government in promoting the consumption of fish in that country. Recently, he was a member of a team of Danish fisheries experts who helped develop fisheries in Uruguay.

Ecuador. The Ecuadorian project is to appraise the fisheries resources of the country, to recommend a plan for their conservation and mangement and to help extend local consumption. Dr. Erwin C. Schweigger, well known for his fisheries biological and oceanographical work in Peru, will conduct the biological work involved in this project. His work, expected to last for about six months, will begin about the middle of August. Another expert will carry out the marketing phases of this project.

Ceylon. Mr. Alan Glanville, an English fishing engineer, has been assigned to Ceylon for one year to assist in the mechanization of the fishing fleet and fishing operations to increase production for local consumption. Mr. Glanville formerly operated his own fishing boat out of England and more recently studied fishing methods and techniques in the U.S.A. Mr. Traung, of the Headquarters' staff, will also assist in this project.

Haiti. Perhaps the most advanced of FAO's fisheries technical assistance projects is that of fish culture in Haiti (*see FAO Fisheries Bulletin*, Vol. 4, Nos. 1-2, 3) where the first phase of the work — establishment of nurseries and ponds — has been completed. This included the construction of seven ponds, introduction of carp and *Tilapia* from abroad, and the beginning of experiments to rear indigenous species. Future work will consist of utilizing these facilities in the actual culture and rearing of both introduced and indigenous species, preparing suitable fishing gear and transportation equipment and in demonstrating acceptable methods for pond culture to local people in Haiti.

India As a result of assistance given at various times by Dr. G. L. Kesteven, Regional Fisheries Officer, Far East, to the government of the state of West Bengal, the Government of India, on behalf of West Bengal, has requested aid in the development of fisheries in fresh and brackish waters of that state to produce food for local consumption.

Pakistan. In order to relieve the congestion at the present Karachi harbor and to provide for the larger fishing fleet expected to result from mechanization, the project in Pakistan is to develop a fish harbor in Karachi. It is also expected that a larger harbor and more extensive port facilities will result in a more orderly marketing of the catch. Dr. Arie van den Berg, a marine engineer from the Netherlands, will work on problems concerned with the harbor works and installations. Dr.H. van Pel, also from the Netherlands, will assist in designing the shore facilities to handle the catch. Both of these experts, already working on the project, have extensive experience in these fields as a result of many years' work on fisheries problems in Indonesia. Another expert will handle the economic and marketing phases of the project.

Thailand. While Thailand has vast inland fisheries, there is a need for assistance in improving pond culture techniques and for intensifying fishing activities to increase production for consumption among peoples living in the hinterland where animal protein foods are scarce and expensive. There is also need for developing a fishery extension service to disseminate information among inland fish farmers on fresh-water fish culture methods. Mr. S. W. Ling, fish culturist in the FAO Far East Regional Office in Bangkok, has been assigned to this project for one year.

Turkey R. H. Fiedler, FAO Technical Assistance Officer for Fisheries, at the request of the Government of Turkey, has made a reconnaissance survey of the Turkish fisheries industry during the first two weeks of July to determine which types of technical assistance would lead to increased fish production for domestic consumption, and to improve the organization of the various elements in the fisheries industry. A draft agreement between FAO and the Government of Turkey is in preparation.

The agreement will include aid on fish production, processing and marketing.

Notes on Films

L'INDUSTRIE DU HOMARD AUX ÎLES DE LA MADELEINE (Lobster Industry of the Magdalen Islands). Producer and distributor: Quebec Provincial Publicity Bureau, Service de Ciné-photographie, 65, Grande-Allée, Quebec, Canada. Produced in co-operation with the Canadian Department of Fisheries. Technical data : 16 mm., color, sound, 800 feet, 20 minutes running time ; commentary and titles in English or French. Price : color : Can. $160.00 ; black and white : Can. $50.000 ; free rental for color print.

Animated maps show the location of the Magdalen Islands where fishing for lobsters is the main industry. The preparation of lobster traps, setting and hauling of the trap lines, are also shown. Strict conservation regulations limiting the number of traps per fisherman to 300 are enforced. A government inspector measures the lobsters immediately on landing ; berried females and undersized lobsters are immediately returned to the sea. Lobsters are stored in live cars, placed in the sea in sheltered areas and later packed and shipped alive to the market, sometimes by air. About two-thirds of the catch goes to packing plants. Detailed pictures of the boiling of lobsters, detachment of the claws and picking of the meat are included. The meat is sometimes packed in 2-lb. cardboard or metal containers or with ice in barrels and shipped fresh to the markets after close government inspection. The rest are put in cans and heat processed. The preparation of lobster paste, the operation of exhaust boxes, cooking retorts and cooling by water-spraying are also shown. Canned lobster undergoes detailed inspection before a shipping certificate is issued. Gives a detailed account of the whole fishing, packing, and shipping operations.

M. J.

SMALL MOUTH BASS STUDIES IN CAYUGA LAKE Producer and distributor: NewYork State College of Agriculture, Cornell University, Ithaca, N.Y., U.S.A. Technical data : 16 mm. color, silent, 400 feet, 15 minutes running time, titles in English. Price : 16 mm. color : $66.00, obtainable from distributor.

Presents the highlights of a long term fishery research program, carried out by the Laboratory of Limnology and Fisheries of Cornell University, on the small mouth bass in Cayuga Lake from 1941 to 1945. Depicts the principal phases of the fish's life history which are under investigation and the methods commonly employed in fishery study (growth, marking, tagging, netting, etc.). There are micro-photographs of the fertilized eggs, its eclosion and the free swimming black fry. Several sequences show the sport fishing with hook and line using earthworms as bait.

B. F. O. T.

TUNA FISHING Producer : Paul Hoefler Productions, 7934 Santa Monica Boulevard, Los Angeles, California, U.S.A., in co-operation with Robert E. Burgent. Distributor : Paul Hoefler Productions. Technical data : 16 mm., black and white and color, sound, 396 feet, 11 minutes running time, commentary and titles in English. Price : black and white print, US $45.00 ; color US $80.00 ; no rentals.

Shows the different tuna species of commercial importance on the Pacific coast of the U.S.A., describing their characteristics. Maps indicate the location of the tuna fishing grounds off southern California, Central America and the Galapagos Islands, off Ecuador. Sequences show fishing with seines for live bait off the coast of Central America. The bait is stored in live tanks aboard the tuna clippers. The boats are then seen proceeding to the fishing grounds where a watchman in the crows-nest scans the surface for signs of porpoises or other creatures which generally are the first indications of tuna schools. The fishing operation and storage itself as carried out by fishermen from the west coast of the U.S.A., are shown in great detail. The fish are stored aboard the clippers in tanks where they are first chilled in cooled sea water and later on frozen in brine. Gives a rather complete description of the methods employed in the hook and line tuna fishery as carried out off the west coast of the U. S. A.

M. J.

TUNA PACKING Producer : Paul Hoefler Productions, 7934 Santa Monica Boulevard, Los Angeles, California, U.S.A., in co-operation with Robert E. Burgent. Distributor : Paul Hoefler Productions. Technical data : 16 mm., black and white and color, sound, 396 feet, 11 minutes running time, commentary and titles in English. Price : black and white print, US $45.00 ; color US $80.00 ; no rentals.

Shows the unloading of tuna which is flumed into the packing plant. Here it is brought on conveyors to scales, then cut open and the viscera removed ; the livers are kept separate. The fish itself is inspected for quality, signs of spoilage being detected by smell. It is then placed on racks and steamed in horizontal, non-pressure retorts for 3 to 8 hours, whereupon the fish are collected, trimmed and packed in cans. Details show the processing of the closed cans and the close supervision under which the processing is carried out to insure complete

safety of the canned product. The last sequences show labeling and coating of the cans and their shipment. The film gives a complete description of the various steps in the canning of tuna as carried out in the western part of the U.S.A.

M. J.

Notes on Publications

FWS 9.6 PUBLICATIONS UDC 05:639. 2

Indo-Pacific Fisheries Council. *List of Scientific and Other Periodicals Pub-*
1951 *lished in the Indo-Pacific Area.* Bangkok, Thailand, January 1951. 31 pp. In English.

A list of 268 periodicals pertaining to fisheries work, classified according to country (Australia, Burma, Ceylon, China, Federation of Malaya and Singapore, Hawaii, Hong-Kong, India, Indo-China, Indonesia, Japan, Korea, New Zealand, Pakistan, Philippines, Sarawak, Thailand, U.K. and the U.S.A). It contains, in tabulated form, the title of each journal, the language and frequency of publication, year publication commenced, number of volume and/or part last published and date, price of subscription and address where periodicals may be obtained.

E.H.

FWS 9.4 INTERNATIONAL AGENCIES UDC 341.1

United Nations Educational, Scientific and Cultural Organization. *Direc-*
1950 *tory of International Scientific Organizations.* Paris, France. xiii + 224 pp. In English and French. Price $1 ; 6s ; F. Fr. 300

Lists international and regional organizations dealing with the various sciences under three sections : Fundamental Sciences ; Applied Sciences, which is divided into Agriculture, Engineering and Medicine ; and Miscellaneous. Gives official names in French and English, address, whether government or private, purpose, administrative structure, member countries, commissions, resources, finances, meetings, voting system, publications, relations with other international bodies, historic, bibliographical and general observations.

H.R.Jr.

FWS 9.4 FISHERIES ADMINISTRATION UDC 35

Quebec Province, Canada, Ministre de la chasse et des pêcheries. *Rapport*
1950 *general... concernant les activités du Département des Pêcheries pour l'exercice financier* 1949/50 (General Report... concerning the activities of the Department of Fisheries during the fiscal year 1949 50). Contributions from the Department of Fisheries, Quebec, No. 31. Quebec, P.Q., Canada. 194 pp., illus., tables. In French.

Annual report giving information on the inspection service, marketing, licensing, biological and hydrographic research, fisheries education at

the fisheries college and fishermen's school. Gives statistics by districts, on categories of fish landings, prices received by fishermen and on the secondary industries, showing the quantities and values of the various products obtained from the most important species. Statics on fishermen by district, numbers and types of boats and their values and the main species of fish landed are also listed.

E.H.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL UDC 57

Vilela, H. 1950 *Vida Bentónica de Tapes decussatus L.* (Benthonic Life of *Tapes decussatus* L.). Travaux de la station de biologie maritime de Lisbonne, No. 53, October, 1950. Estação de Biologia Marítima, Aquário Vasco da Gama, Lisbon, Portugal. 120 pp., 26 fig., 18 pl., tables. In Portuguese, with French summary.

A monograph, also published in the Archives of the Bocage Museum, Vol. 21, Lisbon, Portugal, 1950, on the life history of the commercially important, grooved carpet shell from the time it finishes its pelagic larval life through its benthonic life cycle. Covers studies on the systematic and biotic relationships, geographic distribution, morphology and anatomy, habitat, growth and reproduction. Also presents an analysis of the commercial value in respect of abundance, consumption, export and technological considerations on the nutritive value and salubrity of this mollusk.

H.R.Jr.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL UDC 57 (65) — ALGERIA

Bulletin des travaux de la station d'aquiculture et de pêche de Castiglione 1950 (Bulletin of Studies by the Aquiculture and Fisheries Laboratory of Castiglione), New Series No. 2, Inspection générale de l'agriculture, Algeria. 184 pp., illus. In French.

Contains eight memoirs written by several authors encompassing studies of the fauna of the trawling grounds of the Bay of Castiglione, descriptions and records of occurrence of new species of fish and crustaceans in Mediterranean waters, also information on a fish found in African rivers.

H.R.Jr.

FWS 6.3 SEAWEEDS UDC 582.26

Chapman V. J. 1950 *Seaweeds and their Uses.* Methuen & Co. Ltd. 36 Essex St., Strand, London W. C. 2, England. 287 pp., 20 pl., and 52 text illus. Bibliography, as well as author, person, plant and subject indices. In English. Price 25s. net.

The textbook is divided into 9 chapters: Ocurrence and Distribution of Seaweeds; Mainly Historical; The Kelp Industry and Iodine; the American Pacific Coast Industry; Agar-agar; Seaweed as Food – I; Seaweed as Food – II; Algin and Seaweeds in Medicine and the Home; Looking for Seaweeds; the World's Supplies.

E.H.

FWS 1.013 FISHES — CHILE UDC 597 (83)

Mann, G. 1950 *Peces de Chile, Clave de Determinación* (Key to the Fishes of Chile). Ministerio de Agricultura, Dirección General de Agricultura, Instituto de Investigaciones Veterinarias, Santiago, Chile. 48 pp., illus. Glossary of technical terms. In Spanish.

Artificial key to the genera and species of fishes recorded in Chilean waters, including those of commercial importance. The key, profusely

illustrated, is dichotomous and only the most distinctive external features are used. New records for Chile are *Ethmidium chilcae, Chromis intercrusma* and *Abudefduf saxatilis.*

B.F.O.T.

FWS 1.015 FISHES — PHILIPPINES UDC 597 (914)

Umali, Agustin F. 1950 *Key to the Families of Common Commercial Fishes in the Philippines.* Research Report 21. United States Department of the Interior, Fish and Wildlife Service, Washington, D. C., U.S.A. 47 pp., 45 fig. In English. Price US $0.20.

To help in the identification of Philippine fish, the author gives two sets of keys : one for cartilaginous fishes, sharks, rays and their allies ; the other for bony fishes ; both illustrated with sketches of the different characters of the species studied. A systematic list of the common commercial fishes and the localities where each is caught abundantly is given at the beginning of the paper.

H.R.Jr.

FWS 1.3 SALMON, ETC. — FRANCE UDC 597.5 (44)

Vibert, Richard. 1950 *Recherches sur le saumon de l'Adour (Salmo salar, Linné). Ages, croissance, cycle génétique, races,* 1942-1948. (Investigations on the Salmon of the River Adour (*Salmo salar* Linnaeus). Ages, Growth, Genetic Cycle, Races, 1942-1948). Direction des eaux et forêts, Ministère de l'Agriculture, Paris, France. 125 pp., illus., tables. In French, with English summary. Reprinted from *Annales de la Station centrale d'hydrobiologie appliquée,* Vol. 3, 1950.

A study made on 240 parrs, 492 smolts and 1,037 clean salmon caught from 1942 to 1948 in the river Adour, giving growth characteristics and information on the problem of the salmon races with new contributions to the subject. The author recommends that similar observations should be made on other salmon rivers of France for comparison.

H.R.Jr.

FWS 0.35 BIOCHEMISTRY UDC 599.1

Williams, R.T., Edit. 1951 *The Biochemistry of Fish.* Biochemical Society Symposia No. 6. University Press, Cambridge, England. 105 pp. In English. Price 12s. net.

A symposium held at the University of Liverpool, England, 22 September 1950, consisting of 7 papers on the biochemistry of fish : Some Comparative Aspects of the Biochemistry of Fish, by E. Baldwin ; The Proteins of Fish, by G. Hamoir ; The Chemistry and Metabolism of the Nitrogenous Extractives in Fish, by J.M. Shewan ; The Chemistry and Metabolism of Fats in Fish, by J.A. Lovern ; Carotenoids in Fish, by T.W. Goodwin ; Bile Salts of Fish, by G.A.D. Haslewood ; Economic Aspects of the Utilization of Fish, by C.L. Cutting.

E.H.

FWS 9.6 REFRIGERATION AND REFRIGERATION MACHINES UDC 621.57

Gottsche, G. and Pohlmann, W. *Formulaire du frigoriste* (Refrigeration
1951 Handbook). Translated into French by R. Guiems; 3rd ed. Dunod, éditeur, 92 rue Bonaparte, Paris, France. 526 pp., 195 illus.,190 Tables, subject index. Little bibliographic information. In French. F. Fr. 2,450.

This completely revised edition contains the latest information on refrigeration engineering, especially as applied to French developments, including ice manufacture, rapid freezing, etc. Chapters on the theoretical aspects are followed by others on all types of refrigeration machines and on all applications of refrigeration, including the installation of equipment.

E.H.

FWS 2.115 BOAT-BUILDING UDC 639.12

Ship & Boat Builder Year Book 1951. John Trundell, Publishers, Ltd.,
1951 Temple Chambers, Temple Avenue, London, E.C. 4, England. 372 pp., illus. In English. Price 25s.

Contains articles on the trend in design of yachts and smaller commercial craft and on different equipment and materials used in boat-building such as engines, plastics, paints, etc. Gives several lists of ship-builders and repair yards, manufacturers of engines, marine fittings, yard equipment, professional consultants, associations, world dock and harbor authorities, commercial diplomatic officers and trade commissioners, fishing-vessel owners in Belgium, Denmark, the Faroe Islands, France, Iceland, Ireland, Netherlands, Norway, Portugal and Sweden.

J.O.T.

FWS 1 FISHERIES RESOURCES UDC 639.2

Blegvad, Harald. *Food from the Waters, In Food and People, Seven*
1950 *Essays.* Bureau of Current Affairs, 117 Piccadilly, London, W. 1., England. pp. 82-95. In English, French and Spanish.

This pamphlet is part of the general series *Food and People* being published under the auspices of UNESCO. After an introduction dealing with basic foods, there are two general sections - "Food from the Sea," and "Fresh Water." The first part includes metabolism in the sea; fishes (the most extensive chapter, discussing fishing grounds, boats and gear, fish fluctuations, over-fishing, and international conventions); other marine animals; and world food supply from the sea. The second part contains chapters on lakes, streams, and rivers; and on food production in fresh waters.

B.F.O.T.

FWS 0.6 FISHERIES TECHNOLOGY UDC 639.2

Schlienz, Walter, Edit. *Technik in der Fischwirtschaft* (Technology in
1950 the Fishing Industry). Part 2. Verlag C. F. Möller, Karlsruhe, Germany. 26 pp., illus. In German. Price DM. 4.50.

Contains 5 papers read at the Refrigeration Conference, Cuxhaven Germany, 1949: Engineering Problems Concerning Fishing Vessels, by H. Hoppe; Fresh Preservation of Fish in Scandinavia and Other Countries,

by G. Borgström ; Engineering Problems in Fish Processing, by F. Lücke ; The Role of the Ocean Fisheries in Relation to Fat Supplies, by Limpächer and The Production of Fish Insulin, by W. Roever.

E. H.

FWS 1 FISHERY PRODUCTS UDC 639.2

Tressler, Donald K., and Lemon, James McW. *Marine Products of Com-*
1951 *merce.* 2nd ed., revised and enlarged. Reinhold Publishing Corporation, 330 West 42nd St., New York 18, N.Y., U.S.A. xiii +765 pp., bibl., illus. In English. Price US $18.00.

The first edition of this book, edited by Donald K. Tressler alone, was printed in 1923 and reprinted in 1940. Since its appearance, it has been considered a *vade mecum* for everyone who works in the field of fisheries. The publication of this revised edition is therefore a welcome event.

This edition, edited jointly by Donald K. Tressler and James McW. Lemon, contains special chapters prepared by many new contributors. The book is useful particularly because it describes many industries on which little literature exists, for instance, the utilization of seaweeds, pearls, turtles, etc. It endeavors, in some chapters, to cover the technology of fisheries' products on a world basis, while others are limited to methods used in the U.S.A. Each chapter has an extensive bibliography, mainly of publications in the English language and limited to articles in periodicals. This has led to some omissions especially on canning and curing, fishing methods and manufacture of by-products, where references to some relatively important books are lacking.

The first chapters describe various methods of salt manufacture and refining. Some on the production of magnesium and bromine from sea water are interesting although more detailed description of these industries is found in books on chemical technology.

The chapters on the manufacture of agar-agar and other seaweed products are highly useful, as are the descriptions of pearl fishing and utilization of mother-of-pearl, corals, etc. Chapters on the characteristics of marine fishes and fluctuations in their abundance are very interesting for technologists.

A comparatively brief chapter describes some of the fishing methods and gear in use in the U.S.A. Extensive Tables and data are given for nutritive values of fishery products. One chapter gives an up-to-date account of refrigerated transport, particularly by rail. Another deals with freezing and freezer storage, but devotes little space to the problems of the handling and storage of fresh fish. Sections on salting give very thorough descriptions of both North American and European cures. Smoking and dehydration of fish are described mainly as carried out in North America. One chapter describes the canning of salmon and tuna and the manufacture of canned sardines in Maine and California, etc. Details on flow sheets for the canning of Maine sardines and river herring are given, also on can sealing equipment and the use of retorts.

Brief chapters explain miscellaneous fishery products such as marinated products, delicatessen, etc., the manufacture of fish meal and oil, and the utilization of stickwater as well as the manufacture of liver oils and their concentration and refining. Various other chapters deal with the manufacture of fish glue and isinglass ; the tanning of fish skins ; with oysters, clams, shrimps, crabs and lobsters, giving both biological data for these fisheries and describing the many manufacturing processes. A chapter on whaling contains detailed biological information and a brief description of the manufacture of whale oil and meal. Other chapters deal with the utilization of seals, sea lions, walruses, sponges, etc.

The final chapter outlines future problems in research and the utilization of fishery products.

With the exception of a few topics, such as live storage, stowage and icing of fish aboard, etc., the book contains descriptions of methods in practically all industries. It is, therefore, very useful for anyone interested in these industries.

M.J.

FWS 1.9 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

Applegate, Vernon C. *Natural History of the Sea Lamprey (Petromyzon*
1950 *marinus) in Michigan.* Special Scientific Report : Fisheries No. 55. United States Department of the Interior, Fish and Wildlife Service, Washington, D.C., U.S.A., December 1950. xii + 237pp., 65 fig., tables, appendices. In English.

A report on the life history and distribution in Michigan waters of the sea lamprey whose presence in the upper Great Lakes is a cause of concern to the fishing industry and conservation agencies because of the predation caused by this parasite to commercially valuable fish. It is a contribution from the Institute for Fisheries Research of the Michigan Department of Conservation to a co-operative program of research being carried out by the different interested factions.

H.R.Jr.

FWS 9.1 FISHERIES RESEARCH, BIOLOGICAL UDC 639.2.001.5

International Commission of Agricultural Industries. *Documentation*
1950 *bibliographique sur les méthodes de signalisation et de baguage des poissons* (Bibliography of the Methods of Marking Fish). Commission internationale des industries agricoles, 18 Avenue de Villars, Paris, France. 19 pp. Mimeographed. In English.

Contains references, including summaries, of 50 recent papers dealing with the use of tagging methods in the study of fish populations. The Commission can provide photographic copies, microfilms or enlargements of the publications listed.

H. R. Jr.

FWS 2.112 FISHING METHODS AND GEAR UDC 639.2.081.43
— LINE FISHING — TROLLING

Wigutoff, N. B. *Commercial Salmon Trolling.* Fishery Leaflet 387. Unit-
1950 ed States Department of the Interior, Fish and Wildlife Service. Washington D. C., U.S.A., December 1950. 8 pp., illus. In English. Free.

Describes in detail the operation of modern trolling gear, especially salmon trolling which is popular on the Pacific Coast of the United States. Discusses effective operations by a small crew, which gives a fairly dependable financial return on a comparatively small investment.

J.O.T.

FWS 2.112 FISHING METHODS AND GEAR UDC 639.2.081.117
— SEINES — PURSE

Norling, Jo and Ernest. *Pogo på snurpefiske* (Pogo Goes Purse Seining).
1950 Fabritius & Sønners Forlag, Oslo, Norway. 42 pp., 29 illus. In Norwegian. Price N.Kr. 5.75.

This is a story for boys about the salmon purse seining on the North-West Pacific Coast of the U.S.A. and is translated from the American book *Pogo's Fishing Trip* by Arne Grønningsaeter. Detailed descrip-

tions of catching, with drawings. In the introduction the translator mentions that the book is published mainly for the information it provides commercial fishermen.

J.O.T.

FWS 1.1 FISHERIES INDUSTRIES — TUNAS, MACKERELS, ETC. — PHILIPPINES UDC 639.227 (914)

Warfel, Herbert E. *Outlook for Development of a Tuna Industry in the* 1950 *Philippines.* Research Report 28. United States Department of the Interior, Fish and Wildlife Service, Washington D.C., U.S.A. iii + 37 pp., 18 fig. In English. Price U.S. $0.20.

Reports the experiments carried out by three research boats used in the program of the United States Fish and Wildlife Service for the investigation of tuna resources in Philippine waters. Gives historical background and information on the characteristics and commercial value of the ten most common species of tuna there. Recommendations are given for the development of a successful tuna industry.

H.R.Jr.

FWS 9.19 AQUARIUMS UDC 639.334

Martín de Yañiz, Jr. *Atlas Ictiológico. El Acuario, los Peces y su Cría* 1950 (Ichthyological Atlas. The Aquarium, Fish and Fish Culture). Buenos Aires, Argentina. 315 pp., illus. In Spanish.

This book, apparently printed privately, is a popular contribution to Spanish literature on the culture and exhibition of fish in aquariums. While intended primarily for Argentinian aquarium fanciers, it could be of interest to all Latin American countries. The first eight chapters deal with their construction, settling and maintenance, food, diseases and enemies of fish, and generalities. The most extensive section of the book is a description of about 200 species of fish, mainly South American fresh water species of ornamental value. There is an illustration of each species or variety described and, in many cases, useful data on rearing, environment and geographical distribution. The fish are listed in no apparent order, species belonging to the same genus are referred to in different pages. Other chapters are devoted to the gold fish (*Carassius auratus*) and its culture. Descriptions of about 65 species of marine fish and common names of Argentinian fish listed.

B.F.O.T.

FWS 6.9 STARFISH — USE UDC 639.63

Lee, Charles F. *Technological Studies of the Starfish.* Fishery Leaflet 1951 391. United States Department of the Interior, Fish and Wildlife Service, Washington D. C., U.S.A., March 1951. 47 pp., illus. Mimeographed. In English. Free.

Discusses the economic necessity of starfish control in the oyster industry and the methods used. Chemical composition of the starfish is given and the methods of analysis described. The value of starfish meal as protein supplement for the growth of chicks and egg production and as fertilizer is outlined. The presence of thiaminase in starfish and starfish meal and its effects on their nutritive value are explained.

E. H.

FWS 2.1 NAVAL ART AND SCIENCE — DICTIONARIES UDC 656.6(03)

Bosch, F. *Diccionario Náutico. Navegación, Meteorología y Construcción*
1949 *Naval* (Nautical Dictionary. Navigation, Meteorology and Ship-building). Editorial Lys, Buenos Aires, Argentina. 217 pp., illus. In Spanish.

The first of the four parts of this book (pp. 7-102) is a nautical dictionary defining, with the help of figures and diagrams, the most common terms used in seamanship and navigation. Appended to this section are tables representing the buoys and beacons which appear in the Argentinian charts as compared with the British, and showing the characteristics of the shore lights and sea bottom. The second part (pp. 103-131) contains a vocabulary of nautical meteorology and a third section (pp. 133-190), profusely illustrated, deals with ship-building terms. The final part (pp. 171-217) covers international maritime regulations including the Brussels International Convention of 1910 and the York and Antwerp rules of 1924.

B.F.O.T.

FWS 0.6 FOOD TECHNOLOGY UDC 664

Heiss, Rudolf. *Lebensmitteltechnologie* (Food Technology). Verlag von
1950 J. F. Bergmann, Munich, Germany. viii 344 pp., 223 illus. In German. Price DM. 27.60/29.70.

In four parts, deals with basic technical processes in food technology, food preparation methods in which mechanical processes and thermal processes predominate, and with the biochemical technological processes. Fisheries processes, including smoking, marinating, canning, freezing and drying, are described in Part III (8 pp.), in brief outlines and partly illustrated with diagrammatic flow line drawings. Some references are given to recent literature.

E. H.

FWS 0.6 MATERIALS FOR FOOD PROCESSING EQUIPMENT — ALUMINUM UDC 664.8.013

Reynolds Metals Company. *The Aluminum Data Book*. 200, S. 3rd Street,
1950 Louisville 1, Kentucky, U.S.A. 194 pp., 117 tables, 31 fig. In English.

Contains detailed information, mostly in table form, on the large range of aluminum products manufactured by the Reynolds Metals Company, on alloys, tempers, sizes, shapes, physical characteristics, chemical compositions, especially mechanical properties of the "aluminum family of metals" as well as a brief exposition on fabricating methods and other data.

M. Kondrupp

FWS 3.30 CANNED FOOD – U.S.A. UDC 664.8.036.5(73)

The Canning Trade Almanac 1951. 36th. ed. The Canning Trade, 20 S.
1951 Gay St., Baltimore 2, Maryland, U.S.A. 316 pp. In English.

Contains the U.S. Federal Food, Drug and Cosmetic Act and all regulations apply ing to food ; the standards of identity, quality and fill of containers for canned foods, including oysters and shrimps ; canned food grades (no fish) ; labeling requirements, including clam chowder, clam juice, clams, lobster, oysters, salmon, sardines, shrimp and tuna ; can and box sizes ; opening and closing canning dates in various states ; pack statistics ; directories of trade associations, boards of arbitration, canning machinery and supplies firms.

E. H.

FWS 3.338 CANNING CONTAINERS — ALUMINUM UDC 664.8.036.551

Nilsen, Knut A. *Aluminium i Hermetikkindustrien* (Aluminum in the
1950 Canning Industry). A/S Nordisk Aluminiumindustri. Johan Grundt Tanum Forlag, Oslo, Norway. 209 pp., 11 tables, 94 fig. In Norwegian. Price N. Kr. 14.40.

Gives information on the use of aluminum for food cans, mentioning a new alloy for canning purposes; surface treatment of the metal (the continuous strip anodizing method and the new "lacquer sealing," a process developed in Norway), design and manufacture of aluminum cans, packing, seaming and other treatment of aluminum cans, sterilization and handling of the packed cans. The chapter on seaming is especially comprehensive and contains many illustrations of can closing machinery, of the seaming operation and of seaming defects and how to avoid them.

M. Kondrupp

FWS 2.4 REFRIGERATION OF FOOD UDC 664.8.037

Dannies, J. H. *Lexikon der Kältetechnick* (Refrigeration lexicon). Ed.
1950 Markewitz-Verlag G.m.b.H., Darmstadt, Germany. 538 pp., illus., tables. In German.

An alphabetically classified collection of essential information, with many tables, covering the whole field of refrigerating engineering and food refrigeration, giving sources of information.

E. H.

FWS 3.5 SALTING — FISH — HERRINGS — ETC. — SPRATS UDC 664.951.222

Borgström, Georg. *What Is Scandinavian Anchovy?* Publication No. 20.
1950 Swedish Institute for Food Research, Göteborg, Sweden, Dec. 1950. 11 pp. Mimeographed. In English.

Gives the origin and 300 year historical development of the Scandinavian anchovy industry and the international trade in this product as evidence that the preparation of sprats, by particular methods of brining, curing and spicing, as anchovy is accepted in Europe. In addition several other fishes, besides those belonging to the Engraulidae have for a long time been packed and accepted as anchovies. It is concluded that there is no justification for the claim excluding sprats from the species permitted to be labeled anchovy, as long as the manufacturing process follows traditional lines. The technological processing is explained.

E. H.